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of

Harvard University

JP

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TRANSACTIONS

1960
10-16

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1896.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1896.

☞ SEE LAST PAGE OF COVER.

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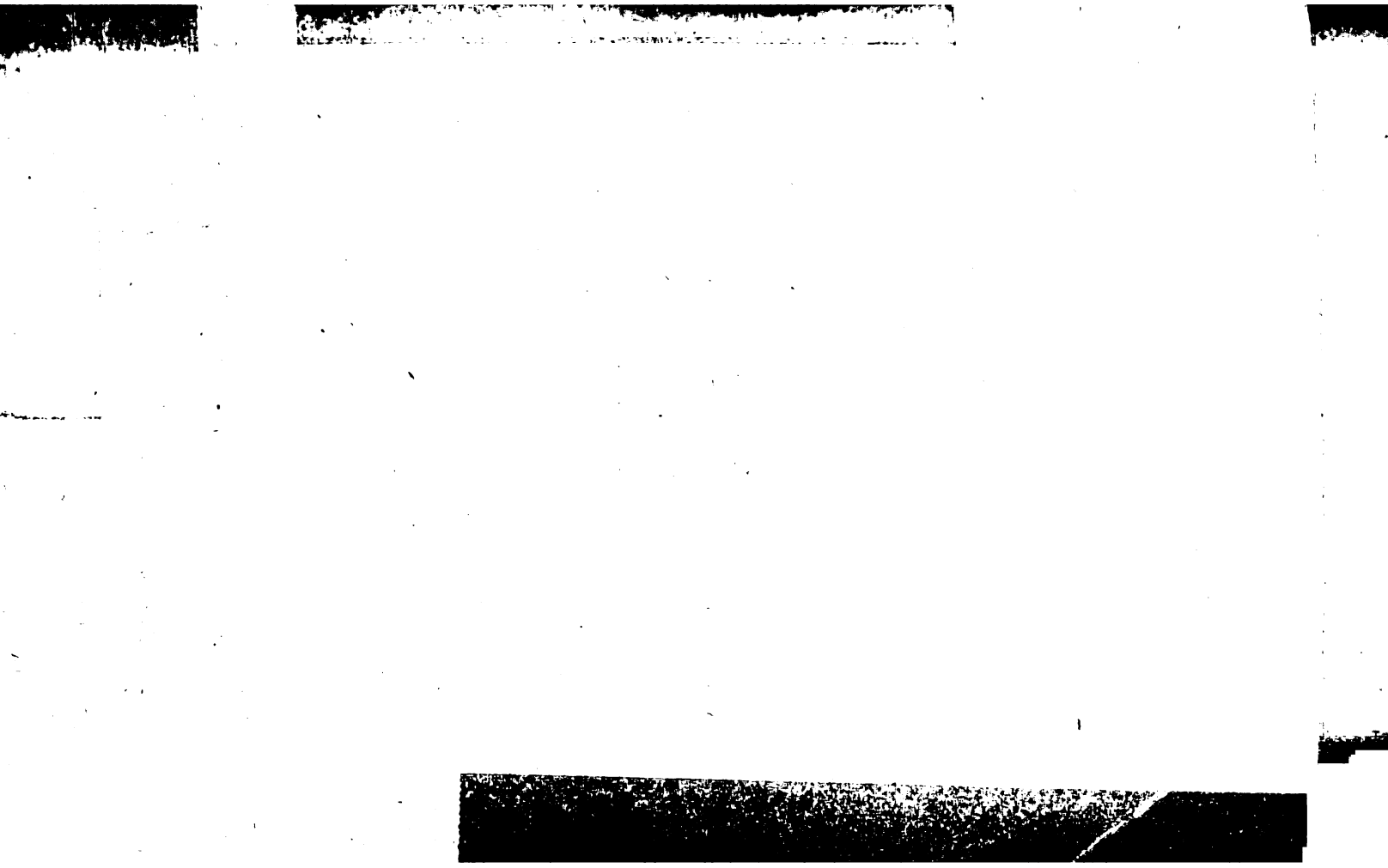

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1896.

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The following papers and discussions have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the "Boston Transcript." As here presented, the papers are printed in full, and the discussions are not only much fuller than in the weekly reports, but, where it appeared necessary, have been carefully revised by the speakers.

The Committee on Publication and Discussion take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature in the papers and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

J. D. W. French,
C. Minot Weld,
B. M. Watson,
Committee on Publication and Discussion.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 4, 1896.

A duly notified stated meeting of the Society was holden at eleven o'clock, the chair being taken by President NATHANIEL T. KIDDER.

This being the commencement of the term of office of the new board of officers and Committees, the retiring President, with appropriate remarks, introduced the President-elect, FRANCIS H. APPLETON, who delivered the usual inaugural address, as follows:

ADDRESS OF PRESIDENT APPLETON.

Fellow-Members of the Massachusetts Horticultural Society:

Twenty-five years ago this year I was sufficiently inoculated with the germ of fondness for, and in interest in, those branches of horticulture which are, in varied form, the charge and care of this Society under legislative assignment, to request that my name be presented for Life Membership, and I feel that had I been called upon to pay fifty dollars, instead of thirty dollars, for my Certificate it would not have been too much.

The possibilities for helpfulness to the individual who is interested in horticulture, and usefulness to horticulture in general, of this Society, are great — indeed much greater than is possible in this present building.

I feel that, in the several branches represented by our Committees, our Society can do more than is now possible, or is now our custom to do, to enlarge and advance the sphere of the

scientific and practical usefulness to, and the market possibilities for, our horticulturists.

Under the law, our property must be used strictly for the advancement of horticulture, and for that object must our income and real estate be directed. To that end are our special Committees on Plants, Flowers, Fruits, Vegetables, and Gardens chosen from those of our members who are best able to conduct such duties; and so are the members of the other Committees chosen for their fitness to carefully conduct the duties assigned to them.

Each Committee is wisely limited in the scope of its duties, and it is to them, in their several lines, that the Society must look for suggestions as to improvement, which must be subject to review from a financial standpoint. Income is always limited.

I believe, under like reasoning, that the interests of every member of the Society would be promoted by having the Real Estate and other invested property of the Society placed in the hands of a carefully constituted Board of Trustees.

After my twenty-five years of membership, somewhat actively passed upon several of our Committees, and after a quite general interchange of opinions among our members, I feel convinced of the value to horticultural interests in the State of the adoption of the foregoing proposed plan.

I venture to express the hope that you will be prepared to favor such a proposition, if it shall be presented to you later in wise form.

As proof of the indirect benefits from our work in various ways let me relate the following:

Not very long ago I visited certain Rose houses in the neighborhood of Boston, which covered several acres with glass, and whence I had known that all the product of roses had been shipped to New York. I asked the superintendent if New York continued to be their market. "Oh, no," said he; "all our roses now find ready sale in Boston." And I learned that, in his opinion, the Exhibitions of our Horticultural Society had accomplished so much towards building up in Boston an increased taste, and increased demand, for well-grown flowers, that the change of market had been thus brought about.

Look over the list of our members, and you find but few who have not contributed somewhat to horticultural work.

It is to this Society's encouragement, and to the work of its members, that our citizens are largely indebted for the beautiful suburban landscape that is made up of the homes of our wealthy and prosperous people. That encouragement and good work extends beyond the limits of Boston's suburbs.

The horticultural work undertaken by our municipalities throughout our State has also been stimulated and advanced by the example set by distinguished members of our Society, and others like them, whose beautiful grounds stand as object lessons in all branches of such work.

To show how horticultural tastes may be promoted, pardon my being a bit personal. My early days were passed in the city of Salem, where a home was incomplete without such a surrounding garden as the experience of most of you can readily picture, with its fruits and flowers, paths and hedges; and there a phase of horticultural liking was promoted.

Later, a change of home to the neighboring country gave fields and pastures, with natural growths of trees, shrubs, and native flora, with all the living accompaniments that interest, and benefit or torment; all of which gave opportunity that has developed another phase of horticultural taste.

With such varied surroundings, could tastes, other than those that are framed with horticultural likings, be expected, even though they are moderate in degree.

Thus are individuals encouraged, in part, to aid in advancing the work that our Society promotes.

How can any one, living in these days and knowing of the incorporated "Board of Trustees of Public Reservations," with their right to hold any land within the limits of, and in trust for, the State; also any one having a knowledge of the Metropolitan Park Commission, with its right to take and hold lands within that territory, whose life comes from the profits of business transactions largely consummated in that section of Metropolitan Boston which can be called "the City," and any one having a knowledge of the Boston Park Commission, which has constructed and developed a system of connected Public Park lands, from which the Metropolitan Park lands, and certain of the Public Reservations, are to become readily accessible, — how can any such person, if he has traveled, not agree that there is no city anywhere, especially on a seacoast, and on the banks of

two naturally beautiful rivers, with attractive streams and lakes, with hills and forests within and near her borders, that approaches the Boston of the near future in horticultural and landscape conditions?

The surroundings of these Parks offer limitless opportunities for landscape effect, and other horticultural work. The degree of beauty that shall result therefrom must be gauged by the skill and knowledge of those who have the moulding of such opportunities into realities.

Our lectures can in part be directed towards the preservation of high ideals in that direction, to good advantage.

Good taste in all our horticultural work should be encouraged, to prevent bad taste.

The market gardens in the neighborhood of this city, and elsewhere, whence we receive the fine specimens of produce that decorate our tables, are generally models of the application of science and business methods, to the work that is there conducted. Therein they set an example which our agriculturists can always adopt to their profit.

Business method means all possible economy; and application of science means prevention of waste, and increase of profit; all are essential to success whether in horticulture or farming. Herein is shown a field for usefulness of Experiment Stations and kindred establishments, but they will not always meet our needs unless our needs are made known to those who direct them, to guide their course of investigation.

The Winter Meeting of our State Board of Agriculture, and the numerous meetings that are conducted throughout the State with the Board's aid during the year, draw out the needs of agriculture, and attempt to meet them with wise advice.

As that State Board is constituted to perform educational work that shall benefit our horticultural and farming interests, it seems fitting that our Representative upon that Board should report on the beneficial work of said Board, as is done this year.

State and Nation are liberal to an extreme degree in our interest, and the money that is appropriated needs to be judiciously used and the results wisely disseminated in the cause of horticulture and farming to ensure its continuance to our stations and agricultural colleges.

This Society was organized March 17, 1829, and its Act of

Incorporation was signed by the Governor on the 12th of June. When its members assembled in the "Society's Room," which was termed convenient and spacious, over the counting-room of the "New England Farmer," at 52 North Market street, little did they dream that, sixty-seven years later, the same Society would be established here, as complete owner of this valuable location, which is almost surrounded by daylight. Nor did they suppose that this Society would exist to see the day when it had outgrown the arrangements which were made for it by their successors upon this site only thirty years ago.

We are probably all alive to our present deficiencies, but wisdom and good judgment have led your chosen officers to be cautious in studying our needs, and in advising plans for action.

When your officers are prepared to present plans to you for improvements in our Society's home that in their judgment will make the administration of the Society's chartered work easier and more effective, I bespeak for them your favorable consideration.

This city has made remarkable advances since this building was erected in 1865. The district devoted to business and trade has been greatly extended, and the centres of literary and social activity have greatly changed. The increase of population and valuation, the construction of our park systems, our improved methods of land transportation, and the spreading out of the people to whom Boston is their source of income, over an extended metropolitan area, make the conditions under which this Society is called on to do its work bear a changed and important proportion to the wonderful development of Boston.

From the Town of the days of the founders of this Society, with its cows pastured on the Common, and only two malls then constructed there, what advances have been made are evidenced by the beautiful trees that are growing upon that Common today, and the fact that our Common and its neighbor, the Public Garden, together, offer a problem to the landscape architect and engineer, upon the wise solution of which may depend the preservation of its beauty and usefulness to future generations. As an open-air space for the refreshment and promotion of the health of our citizens it must forever remain.

Something must soon be done to enable our Society to keep pace with the changed conditions that surround us.

Upon this valuable location, I have said, we have a building ill adapted to our needs. Our Exhibitions cannot be seen to good advantage on account of the necessarily crowded condition of what can be exhibited, in the lines of plants and flowers especially; and many of the larger plants that should be shown, could they be readily brought into position, *now* never reach our halls on account of, not only the great difficulty in carrying them into position up two flights of stairs (our elevator service being necessarily cramped), but also of the greater risk and probability of injury from having to carry many of them up in an inclined position.

Even in the case of the lighter exhibits, which can be easily carried to the tables, those who visit the show are too often inconvenienced, as is also the case with the plants and flowers, by the narrowness of the aisles. It is frequently the case that the usefulness of an exhibit is much lessened from the fact that there is insufficient room for the interested group to discuss it. Under such conditions today those visitors who have come to see and learn, but are not expert growers, meet with inconvenience and a degree of discouragement that is undesirable.

The accommodations for our volunteer Committees, upon whose careful decisions much always depends, could well be made better, and enable them to have improved opportunities to discuss the merits of the several exhibits before concluding their awards. Committee rooms are needed, and a room for the Treasurer and Superintendent of the Building is desirable. In such rooms the Executive, Finance, Library, and Lecture and Publication Committees would find convenient quarters for meetings that would relieve the Library, and be useful as anterooms when our halls were let for evening or other uses.

Such rooms should be under the control and assignment of the Superintendent of the Building.

With two flights of stairs for visitors to mount to enjoy more than half of our larger, beautiful Exhibitions, and a third flight to climb in order to secure one of those exquisite bird's-eye views, made more beautiful by the electric lights, in the Upper Hall, many would-be visitors are kept from our shows on account of age, or inability to mount our stairs. Our treasury suffers in

consequence of such inconvenience, and the cheering influence that might be imparted to many whose lives are confined to a city home is lost.

I would not call to your attention so publicly our deficiencies, as they appear to me, did I believe there was any chance of further detracting from the attendance in these quarters, but I consider that such detraction has been already discounted, and that the treasury has already suffered from these causes.

A most valuable asset towards promoting the objects for which we are a chartered institution is the Library. My intimate connection with this department, as a member of its Committee for a number of years, has enabled me to see that its value is great for our purpose; but the opportunities for using it and distributing its usefulness, bear too small a proportion to its value.

Its books are accumulating without shelf room to receive them, and are so filling up the floor and tables of the library and reading-room, and also the vacant space on the shelves behind the regularly shelved books, that the discouragements to use the library room are thus very great.

For some reason, not quite clear, the heating apparatus seems to be beyond control in the library rooms in the colder season, and the high temperature is complained of by members.

To accomplish the best results a reading-room should not be occupied by others than those having the delivery of its books in charge, while the reading-room and stack-room are combined, and be otherwise exclusively for readers. Where possible, a reading-room should be separate from the stack-room; but this is more than we should expect.

I feel that it is in the interest of advance in horticulture, so far as our Library can assist, that the minimum of work should be done in our reading-room, as at present constituted.

The shelves are now overflowing with books, and I will suggest that it may be a waste of money to attempt to improve the Library accommodation in this location.

To be of most use, our awards of prizes should be issued soon after the awards are made; and the effectiveness of the essays delivered is increased by early publication, when the Committee decide to print them.

Lists of Library acquisitions are always hung upon our walls, and they, with the corrected list of members, can well wait until

the Secretary can issue them, which is not always possible until after considerable correspondence. Our publications should not be delayed for these two latter. The Secretary is required to keep copies of correspondence, but the custom of copying by hand can well be replaced by the use of the letter-press, and meet the constitutional requirement. The adoption of the modern method of shorthand and typewriting, by an assistant, would seem to promote both correspondence and copying, and leave more time for other necessary work.

The Librarian controls the Library under the Library Committee, and all directions should go through him as to all Library matters, in the same manner as is the case of our Superintendent controlling the building under the Finance Committee.

I believe that a system of Bulletins in place of our Transactions might be found more beneficial; and these could be placed upon our tables, or mailed to those who should have requested that such be done. There would then be no unreasonable delay in having useful information reach our horticulturists in good season.

I ask the Committee on that subject to consider even a further reduction of the number of lectures, if that will secure the presentation of all in better form for the printer, from a financial standpoint. It has been suggested to me that semi-monthly lectures might be desirable. I consider that the Committee have full power to establish the number of lectures, and publish such as they may select, whether they shall be issued in Bulletin form or in the present form of Transactions.

I believe that it has been in past years a custom with the Society to offer prizes for Essays upon subjects to be given by the Committee, and such a method is named in our Constitution. A change to that form of securing lectures might prove of value, by promoting increased interest.

I submit these thoughts for consideration by the appropriate Committee.

The safety of our Library now lies in insurance, and not in the building which houses it. No library of such value as ours now possesses, could have been deemed possible when this building was erected; if it had, the library room would probably have been constructed in 1865 in a manner different from a purely commercial building.

It is supposed that the contents of a purely commercial building can be replaced in case of loss with the money received from insurance. But such is not possible with many of the books in a valuable library such as is ours, which ranks very high, if not first of its kind.

We are dependent for rental, above our first story, in this valuable location, from our halls when they are not required for our regular exhibitions or lectures.

In these we are greatly handicapped for two chief reasons. First of these is, that we have not suitable toilet and dressing rooms to make the halls as desirable as they should be for the best-paying uses, or, indeed, for any demands such as are in keeping with modern requirements.

Second of these is, that by reserving our lower hall for our lectures on Saturdays, in January, February, and March, it is impossible to accommodate a certain class of applicants for its use, whose best receipts come by renting for a complete week, especially in the middle of the winter season.

I present this phase to show that the ownership of so much space devoted to halls, such as are ours in this location, is unwise, with the adaptability to our needs so poor.

During the past and previous years, several plans have been considered by your chosen Committee, which were presented to them with a view to improving the accommodations for our chartered work, and which were estimated to yield fair revenue to promote that work.

The alteration of the present building has been considered, but it appears that such action can only change the conditions, and better them but little, if at all. If changes are to be made, they should include radical and advanced improvements.

A leading firm of architects, and a competent real-estate firm, upon request, freely submitted a plan for an entirely new fireproof building upon this site, of the extreme height allowed by law, which would reserve the two upper stories for one hall (for all but our largest exhibitions), a two-story library and reading-room, with committee rooms separated by folding doors which would allow of their being thrown into one; and afford other needed accommodations. The financial showing upon this plan appeared quite favorable to the Society when made. The balance

of the building was planned to contain rentable stores and offices, with good elevators.

Such a plan contemplated hiring a larger hall, or erecting a large tent, in the warmer season, for the larger exhibitions. It has been suggested that an exhibition in such a tent at Franklin Park, or in one of the new buildings being erected there, might be wise, if well advertised.

Another firm of architects submitted a sketch for a building suited to a new, proposed site, if our present property could, in the opinion of our Committee, be sold advantageously, and a wise purchase of land could be made elsewhere. Several locations were suggested, and considered in this connection.

Conferences were also held with leading city officials, to ascertain whether it was likely that the city would favor this Society in selecting a new site in connection with the Park systems, or elsewhere, in view of the importance of its work to public interest. There are possibilities in this direction.

I am told that in Philadelphia a new and ample Horticultural Hall, and anterooms, is either planned, or completed, that is handsome and convenient for its exhibitions, and for large assemblies. This is located in the heart of the city, and readily accessible by street-cars, carriages, or on foot.

I have deemed it wise to present to you these facts and suggestions in advance of that time (soon, I hope) when your Committee will find it wise to present to you recommendations. It is fair that you should not be led by the idea that your Committee has been inactive, for the members who compose it have been mindful of the Society's interests and chartered duties.

The subject is still under consideration, and your Committee can be trusted to act with wisdom and with discretion.

Before concluding with a summary of suggestions, in brief, I wish to commend the volunteer work in the promotion of our duties by so many of our members. It is by no means only those who so freely give of their time to act for the Society, so usefully, in this building, and who deserve much credit for assisting in making our meetings possible; but also the many other members, who constitute our useful and reserve force, who, at their homes and by their influence, contribute largely to make the Society's influence felt for good.

I would commend the subject of useful and injurious birds, useful and injurious insects, the value of water in connection with the fertility of our soils, the general subject of Botany, the usefulness of books on these subjects in our schools as cultivating the powers of observation, and the value of appropriately planted school yards, and home windows — all these, as worthy of promotion by the Society.

All these subjects are greatly promoted by volunteer work.

It is wise to make known to our members, and the public, methods to prevent the spread of all injurious pests, and which will cause their destruction, so that such injuries shall not be allowed to multiply to such an extent as to become in any case public nuisances.

Intelligence of the individual should prevent the necessity of calling for Government aid, by not allowing extreme cases to exist.

Our Experiment Stations are established to help in this direction, and are now well equipped. They have issued carefully prepared Bulletins for this purpose, and it is extraordinary how little heed is too often paid to the valuable advice contained therein. Even this city has not been exempt from this criticism lately.

Let us remember the true motto, that prevention is always better than cure.

Should it be decided to sell our building, we should endeavor to secure as convenient a location as possible, that we can grow up to, and where our hall shall be made accessible for the largest plants possible of exhibition, with convenient anterooms for our purpose, with fire-proof, and suitable, enclosure for, and that shall encourage the use of, our valuable library.

If we cannot soon find a way to wisely change, or radically improve, these quarters, I would advise a careful consideration of the removal of our library to a safe place of storage until accommodations are constructed in which it will be reasonably protected from fire.

The use of modern methods and conveniences in the conduct of our work, that shall make its usefulness effective, without unnecessary delay, should be adopted when such can be reasonably done

A high standard in our lecture courses, with fewer lectures, if

deemed wise, which will guide us to advanced horticulture, are better than more lectures too hastily constructed.

If subjects which will be of most benefit to our horticulturists are selected early and submitted for the careful study of those who are at work for us in our Experiment Stations, combining science with practice, I am sure their professors will be glad to use our platform to make known their conclusions, and to meet our horticulturists in a mutual exchange of opinions afterwards.

I am sure that your officers and committees are all most sincerely interested to promote our work in a way that will be most effective; but I know that they are hampered by the conditions that now surround them.

If I have appeared to have spoken at too great length, and to have spoken too frankly to the minds of any, I assure you that it is only with a view towards the best interests of what we are all here to work for.

The address was received with applause, and on motion of Ex-President William H. Spooner it was voted that the President be requested to furnish a copy for publication.

The following appropriations, recommended by the Executive Committee on Saturday, the 2d of November, 1895, came up for final action and were unanimously voted, viz.:

For Prizes and Gratuities:

For Plants	$2,000
For Flowers	2,600
For Fruits	1,800
For Vegetables	1,150
For Gardens	500
Total for Prizes and Gratuities for the year 1896	$8,050
For the Committee on Lectures and Publication, this sum to include the income of $50 from the John Lewis Russell Fund	300

The Executive Committee further recommended the following appropriations, which were also unanimously voted, viz.:

For the salaries of the Secretary and Librarian, and the Treasurer and Superintendent of the Building	$3,000
For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee	400

For the Library Committee, for the purchase of magazines and newspapers, binding of books, and incidental expenses of the Committee	$400
For the same Committee, to continue the Card Catalogue of Plates	100
For the Committee on School Gardens and Children's Herbariums, this sum to cover all incidental expenses of the Committee, and to be paid through the usual channels	250

The Executive Committee also reported the appointment of Charles E. Richardson to be Treasurer and Superintendent of the Building, and Robert Manning to be Secretary and Librarian for the year 1896.

J. D. W. French, Chairman of the Commitee on Lectures and Discussions, announced the Programme for the present year, the course to begin on the next Saturday, when E. O. Orpet, of South Lancaster, would read a paper on Hardy Garden Plants, which all were freely and cordially invited to attend.

Robert Manning read his Annual Report as Secretary and Librarian.

Charles N. Brackett, Chairman of the Committee on Vegetables, read the Annual Report of that Committee.

Henry L. Clapp, of the Committee on School Gardens and Children's Herbariums, read the Annual Report of that Committee. A supplementary report was postponed to the next meeting.

These three reports were severally accepted, and referred to the Committee on Publication.

A vote of thanks to Waldo O. Ross for his gift to the Library of forty-seven volumes of " Nature " was unanimously passed.

Benjamin M. Watson moved the appointment of a committee to confer with the retiring President in regard to adding his portrait to the series of portraits of the Presidents of the Society. The motion was carried, and the Chair appointed as that Committee, Mr. Watson, Desmond Fitzgerald, and C. Minot Weld.

J. D. W. French made the following motion: That the Committee on Finance, in consultation with the Committee on the

Library, be authorized to make arrangements for the storage of a portion of the books in some fire-proof building, to relieve the present crowded condition of the shelves. This motion was carried.

On motion of M. H. Norton the thanks of the Society were unanimously presented to the retiring President for the able and impartial manner in which he had performed the duties of his office for the last three years.

A letter was read from Hollis Webster, Secretary of the Boston Mycological Club, expressing the thanks of the Club for the courtesy shown them by the Society, and hearty thanks for the generous hospitality extended.

C. H. TENNEY, of Methuen, and
WILLIAM DONALD, of West Roxbury,

having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected.

Adjourned to Saturday, February 1.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 11, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

HARDY GARDEN PLANTS.

By E. O. ORPET, of South Lancaster.

There is perhaps no need for one to apologize for appearing before a Massachusetts audience on the subject of this paper, for there is probably no other section of the United States where this class of plants is so largely used and appreciated for decorative gardening. Our latitude is well adapted to their culture, owing to the heavy falls, during our average winter, of snow, which is the best of all protecting mediums, and to our summers not being so hot or so dry as in some other parts of the country. We have a climate adapted to grow plants that come from almost all parts of the world, and the possibilities of the hardy flower garden are as great as those of any other branch of Horticulture,

if well studied and the wants of the plants supplied with intelligence.

To begin at the root of the matter, as it were, one thing has often struck me as being absolutely necessary to success, and that is a good preparation for the purpose intended. If one intends to plant a tree it is generally conceded that the operation should be the event of that tree's history in that garden. Whether it be for beauty or utility, there should be careful preparation of the soil, and even more careful choice of situation, since there is to be no more change once the tree is in place. The making of a border for hardy herbaceous and bulbous plants is likewise a permanent matter, for most of these never succeed so well as when left alone and allowed to get deep foothold in the place assigned to them. Changes of a minor nature there must be in the natural order of things, but these can be made without an undue upheaval, for it will take a year or two for a complete recovery to vigor and profuse bloom.

To secure the best results a soil of good depth, with a good supply of natural moisture, and free from the influence of large tree roots is the ideal position for the cultivation of these plants, and, given these conditions, there are unlimited possibilities, and a place where flowers can be gathered from April to November. The soil ought to be dug for at least two feet in depth and made rich at starting, for it is well to keep in mind at all times that a border of this kind should never be dug with spade or fork after being once planted, for, given all the knowledge that pertains to the subject and all possible skill with the implement, it is not possible to dig in among plants of this nature without injuring more or less of them, and this again emphasizes the need of a good preparation beforehand. If it is desired, after the lapse of years, to fertilize to keep up the necessary vitality, it can always be done in the way of top-dressings in autumn, after the advent of cold sufficient to make all dormant for the winter. These top-dressings should consist of well-decayed material that will be easily assimilated by the plants in the spring, and the luxuriance of the returning foliage will cover the whole so that there will be no objectionable appearance in the beds.

It is not my intention to give a list of plants that are suited to this kind of gardening; these can be had from any good catalogue, and their habit and time of bloom also; but it has seemed

to me well to note some that are not specially desirable in a general way. We hear too little of failures; people do not always care to chronicle them, but it is a pity, for much can be learned from them. Some plants seem to have the ability to appropriate a good deal more than consists with the well-being of others surrounding them. Such is the case with *Achillea serrata*, sometimes also called The Pearl, for, given a small plant to start with in the spring, it will by fall have taken to itself a square yard of soil area, and is, besides, a most difficult thing to dig out of other plants. The smooth-leaved Sunflower, *Helianthus lævis*, I have been trying to eradicate for five years in our own borders, but we seem to be as far away from the desired end as ever. It is a decidedly decorative subject in its season, but as it flowers when so many similar plants are in bloom, it is almost impossible to avoid some that are in bloom, and a crop of seed is matured that will make its perpetuity sure. The pretty *Anemone Pennsylvanica* I have also begun to think is impossible to get rid of, for the more one digs the more it spreads. The variegated form of *Ægopodium Podagraria*, the Bishop weed, is sometimes offered in lists, but a more troublesome weed does not exist; it has cost thousands of dollars to dig it out in Central Park, New York, and when visiting the famous gardens at Belvoir Castle last summer, the gardener told me that ever since he took charge he had kept two men doing little else than digging out this weed. And so this list might be added to, and made much longer; but the moral is, a place for everything, and everything in its place. If such subjects were rigidly kept in the wild garden we should hear less complaint as to the ragged appearance of this class of plants, and there would be much less misery for the cultivator. Even among what are undoubtedly regarded as desirable subjects for all borders, there are many that are too apt to increase at the expense of those with less vigor, and these must be checked at all times if the desired harmony is to be maintained.

In our case we like to plant thickly at the outset, using plenty of the sorts easily raised from seed, to cover the space quickly, and thin these out as the better plants take hold, and gradually work out the desired effect. We have also found that in various situations, plants behave differently, each locality suiting some one or other better than we knew, and these have to be lifted and replaced in a more fitting position to preserve the balance of

the whole. This, as indeed all planting of hardy plants, is best done early in the fall, about the time the heavy rains begin; the earth has not then lost its warmth, moisture is present to enable the young roots to take hold quickly, and in most cases there will be no reason the next year to suppose any change has been made as far as the health of the plant is concerned. Spring planting is unwise in many ways, always supposing one has the other alternative; we all have enough to do in spring, dealers included, and I have invariably found that we could procure better stock in fall than in spring, and could rely on getting it in a condition fit to plant, whereas in the spring, in sending to a distance, perhaps we get plants that have been in the best condition to plant a month before our ground was free from frost. It is at all times desirable to get all the work done that we can in the fall, to avoid the spring pressure at home.

Lilies should most surely be planted in the autumn, and also Narcissuses and other bulbs. It does seem sometimes that Lilies are not appreciated as they deserve in our outdoor effects. At Kew last summer I was impressed with the freedom with which they were planted, not alone in their natural order, but among beds of low-growing shrubs and evergreens, especially Rhododendrons. The effect was very beautiful at the time of my visit, and would be for the greater part of the summer, as the various species came into bloom. We can grow these beautiful plants here with as great or greater success Japan Lilies are well adapted to our climate here in the Eastern States, and with few exceptions are permanent garden plants. This is easily explained by the fact that our territory east of the Alleghanies is identical in extent and latitude with that of Japan the climate also being very similar, having the same extremes of heat and cold, so that plants from the East thrive here much better than in Europe. To illustrate, I was much surprised to see at Kew last summer large numbers of *Hydrangea paniculata* grown in pots in the greenhouses, and, on asking the reason, was told that they could not flower them unless the growth was ripened up indoors. We ought to see more Lilies planted here in gardens; they are impatient of a dry soil in summer, or of one in which moisture is superabundant in winter, but in ordinary garden soil they thrive with great success. The best of all positions is among the Rhododendrons, and here we can have a succession

that come on one after another until September frosts. The shade afforded by the Rhododendrons gives a cool soil at all times, and a slight protection from late spring frosts to the young shoots, and in fall the leaves placed about the roots of the Rhododendrons give a sure and safe guard against severe cold, and also keep the bulbs from starting prematurely. There was a time when it was regarded as an astonishing feat to flower *Lilium giganteum* in the outdoor garden, but in such a position as that named, there is no difficulty in not only flowering it for one season, but in growing and increasing the plants indefinitely, and when well grown and flowered, there is no other Lily, and very few hardy plants, that can approach it in its majestic vigor. I have seen the flower stems over ten feet high in the garden of Hon. John Simpkins, at Yarmouthport; his were strong, well-established clumps, and perhaps the finest ever seen in cultivation. There is no reason why this Lily cannot be grown in any garden, but care must be taken in procuring bulbs that are true to name. We have been sadly mistaken once in being supplied with bulbs of *L. cordifolium* for the true *L. giganteum.* There is also another Himalayan lily of tested hardiness here in Massachusetts; I refer to *L. sulphureum,* or *Wallichianum superbum* as it is more often called, though not so correctly. This is one of the most lovely lilies there are, and the specific name "sulphureum" aptly describes the soft yellow interior of the large flowers. Although it comes from the Himalayas, it is as hardy as *L. tigrinum,* and, like the old Tiger Lily, produces little bulbs from the base of each leaf. We have about three dozen nice young bulbs, almost as large as a hen's egg, these being only a year old, and most of them will flower next summer if permitted. This lily used to be rare and costly, but it has recently been propagated in this country to a large extent, and will soon be as cheap as other varieties.

It seems to me that we have too often been inclined to consider these and other plants tender, and coddle them in the greenhouse for no other reason than that they come from the East Indies, forgetting all the time that it is not merely latitude or longitude that concerns us as cultivators, but altitude. If we give but a moment's thought it is reasonable enough; we get Orchids from directly under the Equator that require the coolest possible treatment in greenhouses, and no doubt there are plenty

of plants there also that are hardy enough here outdoors, and a reading of the account of Whymper's ascent of Chimborazo makes one wonder all the more that they have not been seen in cultivation.

While on the subject of lilies, there is one from Central China that will be a decided gain to our gardens when it is more plentiful. I refer to *L. Henryi*, which, as seen at Kew last season, is most distinct, vigorous, and free-flowering. I saw plants that were eight feet high, and bore over thirty of the uniform apricot yellow blooms to a stem; this may not be the maximum number, but it has been attained gradually; each year more strength has brought more bloom and no signs of deterioration have been apparent, and there is every reason to believe that it is as good as it is beautiful. *L. auratum platyphyllum* is another good garden lily that is not common; it seems to be a well-marked form of *L. auratum*, with very broad foliage — as broad as that of *L. speciosum*, and like that species, it will thrive indefinitely in the border, the bloom being almost identical with that of *L. auratum*. The Japanese seem now to appreciate that these rare forms are worth cultivating for export, and we can now obtain them at a very reasonable rate. *L. auratum platyphyllum*, or, as it is often called, *L. auratum macranthum*, is one of the finest lilies for the garden, and indeed has been called the "King of all Lilies."

No garden seems to be complete in the early spring months without a selection of Narcissuses, and, taking the best of these, there are few more reliable bulbs for garden use. Of recent years there has been a revival in Narcissus culture that has amounted to a craze, and it has resulted in the production of garden hybrids and forms innumerable. Collectors have also been sent through Southern Europe in search of those that are less known. These two facts need emphasis, for they are fraught with considerable meaning to American cultivators of the Narcissus. We have during recent years made an extensive trial of most of these new introductions, especially those of Spanish origin, and we find that after flowering the first year they dwindle away and rarely succeed in gardens; indeed, of the many that we have had, such as Johnsonii, Queen of Spain, Saragossa, Santa Maria, King Humbert, Pelayo, and others, it is safe to say that not one bulb remains; but though we have not the bulbs, we have the knowledge, and this was the primary reason why they

were planted — to find out which were reliable and most desirable. On the contrary, taking those of hybrid or garden origin, there are few indeed that will fail in American gardens, and by a fortunate coincidence these are by far the best Daffodils. There are raisers today who cultivate and hybridize Narcissuses as carefully as the raisers of hybrid Orchids, the pedigree is as carefully recorded, and all pains taken to improve the race. The reason is simple enough, for there is very little credit or profit in giving to the world such as are not of easy propagation and of vigorous constitution. If they lack these two requisites, we never see them disseminated, and we conclude that all Narcissuses of garden origin are vigorous. There is a phase of Narcissus culture that is too rarely seen in American gardens, and that is naturalized among grass in semi-wild or shady places. The Poet's Narcissus, and the numerous forms that have allegiance to it, all the *incomparabilis* section, and in fact all that have flowers of starry outline, look best and thrive well when planted among grass that is not too rank-growing; and even if this has to be cut off about midsummer, at haying time, the foliage will be ripening off then, and no injury will result from cutting off the tops at that time. There is also less liability to decay from the dreaded base rot than when cultivated in rich soil in borders, though I am inclined to believe that we shall never have so much trouble from this source as is experienced in European gardens. We have never had an authentic case of it in our garden; what was feared at one time to be a case, was simply the deterioration before-mentioned of kinds that were unfitted to the climate.

For cutting for indoor decoration there are few to excel such as Empress, Horsfieldii, Michael Foster, and William Wilks, all of which are bicolors and bloom in succession. Countess of Annesley, Emperor, Sir Watkin, Princeps, and Golden Spur are all of the larger-flowered yellow varieties, and to these may be added the *incomparabilis* and *Barrii* sections that are so plentiful in varieties, but prove to be well adapted to our climate. We have always preferred to keep these bulbs out of the mixed or herbaceous border proper, and keep them in a separate border, which in summer is planted with annuals for cutting purposes; these shade the soil from the burning sun in summer and give also a double crop, as it were, from the same piece of ground. The

Narcissuses are planted in rows sixteen inches apart, and the annuals, such as Stocks, Asters, Mignonette, and like subjects, are set out between each row, and these are gay in late summer and autumn. When these annuals are cleared off after frost, a top-dressing is given all over the beds, and this is all the fertilizer they seem to require. The Narcissus will not thrive indefinitely in the same spot with the same vigor as when lifted every three years and sorted in sizes, replanting them after the soil has been enriched to a good depth. The best time to lift is at the dying off of the foliage; the roots are then found to have died off too, except in the *Poeticus* section, which seem never to be wholly inactive. It is, of course, quite in keeping with a herbaceous border to have clumps of Narcissus mixed in here and there along the margin, and where but few are grown, this is, perhaps, the most desirable way, but where there is a collection of many varieties, it is preferable to have them where labels will not be disturbed and where each kind is near the other for comparison.

I am anxious to say a word or two in favor of the various Tulips other than those generally used for massing for color effects. There are a number of genuine species of Tulips that are most beautiful in the mixed border, and they have also greater vigor and taller habit, and grow on for any number of years without deterioration. *Tulipa Gesneriana* may be taken as the type of these late-flowering kinds, and there are few bulbs that give such rich coloring as this; it is rich without being gaudy. Then there is the Horned Tulip, *T. cornuta*, with petals that narrow out to a point; *T. Greigi*, with its rich colors and prettily spotted leaves; *T. vitellina*, a pure yellow; and so we may go on to the number of fifty or more species that are not often seen cultivated, but some of which are real gems for the rock garden, being of dwarf habit and liable to be spattered by rain if planted on the level ground. You have no doubt heard of the so-called Darwin Tulips. This is only a new name for the old-time Breeder Tulips of the Flemish and English raisers; they were so called because from these were selected the kinds that were considered good enough for naming. The Tulip craze has mostly died out, but the lovely colors of this section give them a charm that is peculiar, and rarely tires; rich dark velvety colors predominate, yellows being absent; no two are alike if bought in mixture;

their stems are erect, stiff, and admirably adapted for cutting. With us they flower at the end of May, and we have found that they like a soil which is not liable to dry out, as the quality of the bloom suffers in dry soil. It is advisable to plant these tulips in small groups of six or eight, and it will be found that each year the quantity of bloom is about doubled from each clump and they are altogether most satisfactory.

Another beautiful hardy plant which is not common, but is perfectly reliable, is *Eremurus robustus*. I know of no other that will give the same effect except the Verbascums, and these are not really hardy. The *E. robustus* throws up a spike from five to six feet high, and for the greater part of its length covered with pale pink flowers which open in quick succession, so that the greater portion is in bloom at the same time. The foliage is prostrate or nearly so when full grown, and soon dies off after blooming, which it does at midsummer. It is one of the noblest of garden plants, so far as our experience goes — not easy to raise from seeds, for very little seed is matured, but once planted, there is no fear of losing it. There is another species, *E. Himalaicus*, which has grown well each year, and we hope to see it bloom this coming season. Mr. Veitch tells me that it is beautiful as seen growing in its home, and is the most beautiful of the genus. There are several other species, but we have no positive knowledge yet as to their hardiness. The place where they are planted should be well marked, or better still, group them together, as the foliage dies off soon after flowering, and some other plants of annual duration may be used to cover the ground.

It is not my province to speak of Annuals as a class at this time, but it is tolerably certain that we cannot do without them in the mixed herbaceous, or whatever other name is given to the border. There is sure to be a scarcity of bloom in July and August, if perennials are relied upon to give a continued effect, for there are so many and varied subjects used in this work, which start early and die off soon after bloom is past, as, for instance, the Oriental Poppies, Mertensia, all bulbs, and more that might be named. The gaps which they leave in the arrangement are not pleasing. It is an easy matter to dot in Zinnias, Asters, Stocks, or even taller-growing annuals, to make good the deficiency, and to give a greater profusion of bloom.

Another point worth naming in this connection is the desirability of having a permanent backing to the borders, if they are extensive, or especially if wide. Ours are twelve feet wide for most of their length, and give scope for the tallest plants there are; but to each border there is a single belt of either *Rosa Rugosa*, *Pyrus Japonica*, *Hydrangea paniculata*, or *Syringa* (Lilacs), each used separately, and this gives a stability to the effect that would not exist otherwise. In the early summer months before the tall Larkspurs, Sunflowers, Asters, and Boltonias get up high enough to serve as a background, we have these early flowering shrubs in bloom, and the effect is greatly enhanced. Another feature — perhaps the most striking of all — is when in late summer the long belt of hardy Hydrangeas is at its best. This is kept well pruned down, and the shoots are thinned out when they start, to give size to the panicles of bloom.

I suppose most of you have the *Dictamnus Fraxinella;* it is well known for its inflammable qualities, but it is not so well known for its poisonous properties. A neighbor last summer had severe eruptions on his arms, and the family physician, a man of long experience, could not diagnose the case, but before admitting this, he very nearly decided it was a case of small-pox, and it also transpired that this poisonous property was not accredited to the plant in his reference books. Being so common in gardens, and so frequently handled when in bloom, its most virulent period, it cannot be too well known that it is a dangerous thing to handle, as I found out years ago when saving and cleaning seeds.

To those who have the requisite location, there are few more interesting features of outdoor gardening than that styled the Rock Garden. I saw two of the best examples of artificial construction last summer that perhaps are to be seen, and it seemed to me that we might do more of it here. We are limited to a comparatively few plants in our climate; the exquisite Saxifrages of the European Alps, the Primulas, Androsaces, Ramondias, Cyclamens, and many of the plants they use abroad will not succeed here, and for that matter some of our choicest Rocky Mountain Alpines absolutely refuse to grow when brought from their high estate, but there are many that will succeed if given a little attention. A well-constructed garden of this sort has a most charming effect when the Moss Pinks, Columbines, and various spring-flowering bulbs are in bloom. It is at all times

advisable to see that the strong do not crowd out the weak, and in this kind of planting it is not possible to use the hoe, and seedlings are sure to appear in abundance, often to the exclusion of the choicest plants. This is true also of borders, and we find that in a short time the best Larkspurs and Phloxes seem to revert to original types, and Columbines hybridize out of recognition; but it is all explained by the fact that seedlings are too numerous, and, until they bloom, have much the same appearance. I am inclined to think the Aquilegias are not strictly perennial; they flower for a year or two, and then disappear. I think this is true also to some extent with all plants that have not a tuberous or bulbous root. We all know how difficult it is to keep the true Rocky Mountain Columbine, or the Siberian *Aquilegia glandulosa;* this all means that we must have a reserve border, where a few plants can be isolated for seed, and the seedlings grown on to fill up losses, or we can test some doubtful plant and propagate desirable ones. There are many reasons which make a place of this description desirable that will occur to all.

Most hardy plants are easily raised from seed, and a seedling plant that is healthy, even though it has never bloomed, is preferable in the long run to any other; there is no serious check in transplanting, neither has it been weakened by flowering. The best time to sow seed would be as soon as gathered; but we usually have too much hot weather at that time, and it is best to wait until a cooler time in fall. If there is a greenhouse at disposal, they can be sown at any time during winter; but I much prefer to get them large enough to be able to winter them over in cold frames, where they do not start much earlier than they would outdoors, and they can be placed in their permanent positions as soon as the ground permits. On the other hand, such as have been grown in the greenhouse need as careful hardening off as if not hardy, for they are made as tender as any plants by their treatment indoors. If any of the seeds fail to germinate, though they are known to be fresh, it is well to put them in a cold place where the soil can be frozen well for a week or two. This seems essential to success with some, such as *Aquilegia Stuarti*, *A. glandulosa*, Anthericums, Hellebores, Clematises, *Rosa rugosa*, and many others that would germinate a few at a time for years, but will come up simultaneously if the freezing

process is adopted, and herein is one of the main advantages of sowing early in the fall.

DISCUSSION.

Mr. Orpet said that *Aster Novæ Angliæ* becomes a weed in the garden.

Professor B. M. Watson asked what success had been obtained with *Lilium auratum*. Mr. Orpet answered that it was impossible to make it grow more than two years, but as it is so cheap we cannot complain of the necessity of renewing it.

Nathaniel T. Kidder inquired about *Tulipa Greigi*. Mr. Orpet said he had grown it for five years, and considered it one of the best of spring plants.

In answer to several questions by F. L. Temple, Mr. Orpet replied that double Delphiniums, such as named French varieties, often die the first winter after importation, but seeds saved from these varieties and sown produce a large percentage of double forms, and these are good permanent garden plants. Aquilegias, too, often act in like manner, dying after the first flowering, and are best taken care of when seeds are saved from the best forms and species and sown each year. *Helenium autumnale* is desirable as a plant for the back border. He never knew the Oriental poppy to winter kill. Gaillardias, however, are hardy perennials which disappear after a short time. The double *Lychnis chalcedonica* is a grand plant to grow in masses. It has been thought to be new to cultivation, but was advertised in catalogues in 1832. He never knew it to grow four feet high; generally it is only two. As the double *L. chalcedonica* does not produce seeds, it must be propagated by means of the suckers made at the base of the old flower stems; these may easily be rooted, but should be wintered over in a cold frame until spring before planting out in the open ground. *Lychnis vespertina fl. pl.* is more beautiful and easier to propagate.

Mr. Temple stated that he had had a form of *Lychnis vespertina fl. pl.* that had flowers as large as a Carnation, and it was sent out as a new and beautiful form.

J. Woodward Manning said that the Double White and Double Scarlet *Lychnis chalcedonica* grow from three to three and one-half feet in America. He also spoke of the Gaillardias, which are true perennials in England, but have the unfortunate habit

of dying out in the centre of the crowns yearly, and for that reason are hardly to be depended upon in our climate.

Mr. Orpet said that Mr. Manning was perfectly correct in regards to Gaillardias, but thought they should be grown if they flower only one year. *Alstrœmeria aurea* is perfectly hardy, and becomes quite a weed in Rhododendron beds. *Lychnis Haageana* is a perennial which lasts for several years, and then dies out.

Mr. Temple wished to call attention to the practice of cutting back perennial border plants with a view to making a display late in the season, and Mr. Orpet stated that in one of the places he had had charge of, the family did not reside there until late in the season, and to produce a late display it was a regular practice to cut back Phloxes, Delphiniums, Heleniums, Silphiums, Asters, and all plants of like growth, so as to produce a late effect from plants that ordinarily would be past their prime.

M. H. Norton stated that by cutting back roses, and keeping the ground moist, they can be kept in bloom during the whole summer.

Mr. Kidder noted that herbaceous plants are comparatively free from insects. He spoke of a new and very destructive insect found on *Anemone Japonica*, and asked if others present knew it.

Mr. Orpet had seen the same insect on Baptisia, and expected to find it on everything next year. Rose-bugs go the whole round of the garden. As to alum dissolved in water, which had been recommended as a remedy for rose-bugs, an ounce to two gallons of water had proved ineffectual.

J. H. Bowditch asked about Aquilegias, which were raised from seed, and succeeded for a few years; then there seemed to be a borer which destroyed them. Mr. Orpet said that plants grow to an exceptionally vigorous state in gardens and are then more liable to rot. He never had much difficulty in transplanting Aquilegias, except *A. glandulosa;* it is very difficult to make this species live after removal. The best way is to raise from seed, and set out from pots; then they will live four or five years.

Professor Watson had found that hand picking is the only absolute remedy for the black beetle which eats *Anemone Japonica* and Clematises. This must be done early in the morning. Bordeaux mixture made very weak has proved successful.

Mr. Manning said that cut-worms and angle-worms enter into

the crowns of Aquilegias and Delphiniums, and do much damage, as also is the case with the wire-worm, to a certain extent.

Mr. Orpet agreed with Mr. Manning, and added that all our native species of Aquilegia are very beautiful, and should be raised from seed saved from plants growing in isolated places, owing to the facility with which the species hybridize. In speaking of so-called perennial plants, he said that they are not all strictly perennial naturally.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 18, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture, provided by the Massachusetts Society for Promoting Agriculture, was delivered:

CONSERVATISM IN SCIENTIFIC AGRICULTURE.

By Professor W. H. JORDAN, Director of the Maine State College Agricultural Experiment Station, Orono, Maine.

The American Agricultural Experiment Station is this year twenty years old; the American College of Agriculture is older. During at least a quarter of a century the teacher and investigator, to a greater or less extent, have been active in this land of ours in their efforts to illuminate the business of the farmer with the beneficent light of Science.

Their success has not been startling, though great enough to justify the effort. Inexperience, imperfect knowledge, the immense labor of successful teaching and investigation, prejudice, the inertia that always attends any educational movement, all have conspired to render the attainment of the ultimate object, viz., a more rational practice of agriculture, slow and difficult.

From one point of view, however, a great deal has been accomplished. Generous endowments, both State and National, expended by a large body of trained workers, an enlightened thought, and an improved farm practice testify not only to past achievements but to present effort on a scale that is truly marvelous.

We may possibly gain courage for our work and faith that the future has its triumphs, and we shall certainly properly introduce our subject, if we gather up into a brief summary a statement of the resources that are now being applied along various lines, to the betterment of agriculture.

According to official statistics there were in 1894 sixty institutions in the United States maintaining courses in agriculture. The faculties of these institutions included one thousand six hundred and forty-three persons, who were using annually nearly four and a half millions of dollars in the instruction of over twenty-one thousand students, about one-fifth of whom are registered in the Course in Agriculture. In the same year the Experiment Stations numbered fifty-five, fifty-one of them receiving Government aid. These stations were officered by five hundred and seventy-seven persons, who were using annually in various ways nearly a million dollars. They published in the year mentioned fifty-four annual reports and four hundred and one bulletins, and distributed this literature to half a million persons who are either directly or indirectly interested in agricultural affairs.

It appears, then, that the time of perhaps two thousand persons,[1] and the outlay of five and one-half million of dollars, are annually being applied to education and investigation, largely that the farmer may know more and do better. It is worthy of remark in passing that of this large sum of money, over two and a quarter million dollars are a direct gift from the national Government. Not all of the expenditure for the maintenance of student instruction in the land-grant colleges is used in teaching agriculture, but a generous proportion is — much larger than is indicated by the percentage of agricultural students.

In addition to this national aid to agriculture, which surpasses that ever provided by any other nation, a majority of the States have established boards of agriculture and have arranged by law for the public instruction of farmers, either through what are called farmers' institutes or by means of migratory schools, such as the dairy schools of New York. We have no means of estimating the time and money thus utilized quite directly for the popular education of the agriculturist, but their amount is large.

This, then, is the situation: Agriculture along with other industries is recognized in our higher institutions of learning

[1] Some who are engaged in teaching are also station workers.

both by elaborate courses of study and by liberally endowed departments of investigation; a great mass of literature dealing with the scientific and semi-scientific phases of agriculture is being spread broadcast over the land; a small army of public teachers, both official and self-constituted, are addressing audiences of farmers from the platform, on every subject that has even a remote relation to farming, and the agricultural press, not to be outstripped in this onward march of new theories and modern methods, is active in reviewing Experiment Station literature and in presenting the views of a great variety of writers, including the scientist, the pseudo-scientist, and the so-called practical man. And so from all this probing for nature's secrets, this speaking and writing, this discussion of new theories and methods, some of which live but for a day, some of which become the vexed subjects of prolonged, earnest discussion, and some of which crystallize into practice, we have attained to an activity of thought, an elaborateness of treatment, and a complexity of detail concerning things agricultural, which present a marked contrast with the conditions that prevailed even twenty-five years ago.

There is at least one complaint the farmers of the United States no longer have the right to utter, which is, that they do not receive full recognition in the exercise of the paternal functions of the National and State governments, or in the growth of the means and methods of public education. Whatever may have been their motives, or the arguments which may have been so successfully used in influencing their action, the representatives of the people have, in their exercise of legislative authority, dealt fairly generously with the industry that feeds us all. Our government may reasonably claim to have done its part up to the present time in the efforts that are being made to impart special education and to discover needed truth.

The question which must come to the workers in College and Station with great force and meaning is: Are we justifying this great use of time and money by what we are accomplishing? Is this tremendous activity that we are putting forth being directed along the right channels? Are those who are teaching and investigating and who are speaking through the press or from the platform, fully recognizing the real needs of agriculture?

It has seemed to me that on this occasion, in the year which marks the twentieth anniversary of the establishment of the first American Experiment Station, it is entirely fitting to ask these questions, and to discuss our relation to their future satisfactory answer.

It is not my purpose at this time to attempt a statistical enumeration and discussion of our appliances for education and investigation, or to undertake a detailed criticism of the methods in vogue in the College and Experiment Station. I do propose, however, to call attention to certain general considerations which I believe should have a controlling influence in the development of class-room and popular instruction, and in the various lines of experiment and investigation.

The subject that is set for discussion is, Conservatism in Scientific Agriculture, which perhaps needs a preliminary definition as indicating the lines of thought which it is proposed to follow.

The conservatism for which I would contend is that which is induced by a recognition of three truths:

First. The proper cultivation of the man is fundamental to the safe development and right use of material resources.

Second. The education, that in agriculture is primarily important, proceeds from instruction in the relations of matter and energy and in the scientific facts and principles which enter into and environ life, rather than in imparting the technics and manual skill of the farm.

Third. Substantial progress in any art must be based upon an accurate knowledge of underlying truths.

Scientific Agriculture is commonly understood to be the practice of agriculture in accordance with the known facts and principles of science, but in our discussion today we will understand it to include as well the various organizations and activities that are auxiliary to agriculture as the means of rendering it more rational. Our subject involves, therefore:

(1.) The Experiment Station.
(2.) College and School Instruction.
(3.) The Farmers' Institute.
(4.) The Press.
(5.) The Farmer.

These I understand to be the various agencies through which an organized effort is being made to convey to agricultural practices the benefits of the exact knowledge we call Science.

We will first consider, then, scientific investigation as a factor of modern agriculture. This is certainly the logical order, for we must discover truth before we can teach it. What relation does our subject bear to the work of the Experiment Station?

There exist, I believe, substantial reasons for the following assertions:

(1.) Much of the experimental data and conclusions now being published by American Experiment Stations will not only fail to find a permanent and useful place in the records of scientific progress, but they have been so reached as to make error easily possible.

(2.) The greatest obstacle to progress, or even safe procedure, in the art of agriculture, now existing, is an insufficient knowledge of foundation facts and principles.

(3.) The two foregoing statements suggest the easy possibility of disappointment from any practice induced by Experiment Station influence when that practice rests as a superstructure upon unsafe or insufficient foundations.

I desire to enlarge at some length upon these statements in order that my meaning may be plain.

And I remark concerning the facts touched by the first statement that they are due in part to a cause which serves as a partial excuse for their existence.

There has existed a natural but unreasonable demand on the part of the public for immediate practical results from Experiment Station work, and so from reasons of policy some have felt it to be necessary to rapidly promulgate conclusions with regard to this or that point in agricultural practice.

In order to do this, experiments of a very practical character have been carried on — experiments, some of them, involving such large chances of error that safe conclusions were not possible. Many of the field tests of fertilizers, feeding experiments, and variety tests are of this class, and the records of them have already begun to find their way into that mass of rubbish which will remain forever buried.

A satisfactory control of such experiments, so that their

apparent outcome may represent the truth, is exceedingly difficult, and even under the best of conditions much repetition and care are necessary to prevent reaching erroneous conclusions.

The discovery and establishment of a truth is no commonplace task. It is not easy so to hedge about a new principle or fact with accurate data that it may be accepted with unreserved confidence, and it has often required years of enthusiastic devotion to scientific labor to accomplish this. These facts the unscientific mind does not apprehend, and so the public is inclined to expect Experiment Stations to reach safe results with the uniform certainty and regularity of a machine.

We are fully convinced that we should have less commercial work, less of the extremely practical experiments, and more of elaborate and severe scientific investigation, — at least there is need that there shall be less haste in the promulgation of conclusions because of a more rigid inquiry into the basis upon which they rest.

There is certainly one reason that every farmer ought to appreciate, why any conclusion which affects his business should be guaranteed by the most exacting inquiry, viz.: the business of agriculture cannot afford the delay or disaster which may result from wrong conclusions. Could we have afforded to adopt the Babcock Test as the basis of commercial dairy work had not the facts fundamental to its use been well established? Should it be proved that the diagnostic properties of tuberculin are not what a conservative opinion has claimed, — a result we do not fear, — would it not be properly regarded as a great disaster for such a mistake to have been made? We plead, therefore, for the conservatism of exact scientific methods in our Experiment Stations and for a patient confidence on the part of the public in what may appear to be slow progress in the solution of Nature's problems.

My second point touching Experiment Station work relates to the imperative need for a better knowledge of those fundamental facts and principles which we think of as belonging to pure science.

We are to some extent attempting to build a superstructure upon insufficient foundations. For instance, we are conducting feeding experiments with foods, the nature and function of whose constituents we do not fully understand, and consequently

we often lack the data necessary to a proper interpretation of results. Until we have a wider and more exact knowledge concerning the character and nutritive functions of the various compounds which we huddle together under the terms *protein* and *nitrogen-free extract*, we shall be handicapped in our attempts to solve problems in animal nutrition.

Such investigations as Stone of Indiana is making on the non-nitrogenous compounds of foods, and workers in the two Connecticut Experiment Stations, on the nitrogenous compounds of the cereal grains and on the functions and value of nutrients, will, I am sure, ultimately prove of much greater service to Agriculture than that large class of experiments which have a more apparent practical application.

It is worthy of note that the only investigations which have outlived a half or even quarter of a century, and which have exerted a profound influence upon Agriculture as an art, are those of a severely scientific character, — investigations which were carried on in the laboratories of scientists who little dreamed of the far-reaching influence of their labors. The men who have given to the word Science the great meaning and dignity which it now has, have been lovers of the truth for truth's sake, and I sometimes fear that we as a people are not cultivating the spirit of the true investigator as we should. Is it true that our scientific labors are taking on a merely commercial aspect? Are we asking as the introduction to every piece of scientific work the question, How much will it be worth in dollars and cents?

For some, these questions fortunately can be answered in the negative. It is desirable, however, that the enthusiastic scientific spirit shall more thoroughly pervade our Experiment Stations, for we sorely need the inevitable outcome of such a spirit. While it is properly a function of the Station to show how existing knowledge may be utilized, by experiments which serve as object lessons, I believe a more important function at the present stage of knowledge is the discovery of laws and facts fundamental to agricultural methods, leaving the application to farm practice of much of this added knowledge largely with the mass of intelligent farmers, where, after all, it must generally be left. I affirm, then, that the conclusions derived from Experiment Station work should manifest a conservatism that is induced by severe and searching methods of experiment and investigation.

Our attention will now be directed towards the work of the schools. This is of prime importance, because here are to be trained the men who will be influential in determining the status of agriculture. The standing of any profession or business depends not so much upon the kind of work performed as upon the character and quality of the men engaged in it, provided, of course, that the work is honorable. If the social horizon of the tiller of the soil is narrow, it is not because he digs in Mother Earth, but is in part because of his inability to reach out to larger social and intellectual opportunities. While it is not to be expected that all the followers of any calling shall stand in the forefront of social and intellectual life, it is certainly true that if agriculture is to maintain its proper dignity and influence among the world's great industries, politically and socially, it must number among its followers men of the same intellectual ability and wide range of vision that are found in other callings.

Farmers have often complained that lawyers have chiefly legislated for them, but if this is true it is partly because they have not been shown their ability to determine their own political and social status. The conditions that make for supremacy in human society are not nullified or reversed as a favor to the farmer. At the same time that we recognize this fact we must admit another of equal importance, viz.: that the interests of agriculture, whether in legislation or in business and social conflicts, are safest in the hands of its own followers who are qualified by education and experience successfully to compete with opposing interests. For these reasons, then, we are anxious that the training of the schools shall render the best possible service to agriculture in the preparation of its leaders.

In order that this shall be accomplished, we must give place to a conservatism which recognizes the value of past experience in the means and methods of imparting a sound education.

When the land-grant colleges were first organized, a popular notion prevailed that an entirely new order of education was to be established — that the matter and manner of the classical college were to be replaced by other subjects and other methods. The young man was to be trained to do rather than to think. The introduction into the curricula of these schools of such subjects as the modern languages, literature, and metaphysics, or even extended instruction in the sciences, was resented by many as

foreign to the spirit and purpose of the act which made these new institutions possible. Had such views prevailed, the cause of technical education would have suffered great harm. These extremists forgot, or never knew, that a man's mastery of affairs does not proceed primarily from memorizing a catalogue of material facts or from manual skill, but rather from his capacity for severe and logical thought, and that a farmer's success is due not so much to his ability to plough a straight furrow or his capacity for hard labor, as to that analytical power of mind which enables him to discern the right relation of things. To equip a man merely with the technics of the practice of agriculture would fall far short of preparing him for that larger social influence which is essential to leadership or the highest success.

Fortunately, we believe, the four years' courses in agriculture, as now presented by our best institutions, include a fair proportion of general training subjects, combined with such a sequence of chemical, physical, and biological studies, that the faithful student not only attains a cultivated intellect, but is given a systematic insight into the world of matter and of life with which he has to deal. Such courses represent the conservative position, and are a logical result of the experience of the past.

That they do not impart sound learning and can only meet the demands of an inferior scholarship I do not for an instant admit.

It seems, however, that some who are interested in our land-grant colleges place a low estimate upon the educational value of Courses in Agriculture as they now exist. Certain recent utterances concerning this matter are like a dash of cold water in the face, to those who had come to regard the agricultural course in some of our colleges as the peer of any other found there.

The most notable of these utterances is the address delivered last winter before the Massachusetts Board of Agriculture by the able President of the New Hampshire Agricultural College. I propose, in this connection, to criticise some of the main points of this address, because they are based upon what in my judgment is a serious misconception of the essentials of a four years' Course in Agriculture, and because in so doing I may be able to make clear the views I desire to present.

Certain conclusions reached by President Murkland may be justly summarized as follows:

(1.) A "pedagogical form" is a "necessity for teaching any subject," meaning by pedagogical form a logical or progressive series of lessons.

(2.) The Courses in Mathematics and Classics have taken on a fixed pedagogical form, which (inferentially) gives them a maximum value as a means of education.

(3.) Courses of study related to agriculture and to engineering, especially the former, have suffered from lack of pedagogical form.

(4.) Engineering, because so closely allied to mathematics, has found a pedagogical form "ready to its hand in the established form of mathematical teaching," and so is now taught in fairly satisfactory courses of study.

(5.) Courses in Agriculture are in a present "practically inextricable" "confusion," because "with such material for teaching as is now available there is no perspective possible in teaching agriculture;" . . . "and where no other science is involved there is nothing of that orderly sequence in the progress of instruction which has made the classical education, and to some degree the scientific education, a process commanding respect."

These latter statements are mostly quotations from the address under discussion, and are those to which I shall chiefly confine my attention.

Dr. Murkland's strictures on the Courses of Agriculture that now exist are based in part on two assumptions:

(1.) That agriculture is, or is susceptible of becoming, an independent science, so that in classifying it for teaching purposes we may properly speak of "other sciences."

(2) That the sciences, such as the chemical and biological, which we now recognize as somewhat "precisely formulated," are not a proper and essential part of a Course in Agriculture, and therefore chemistry, physics, and biology do not, and may not, properly lend their pedagogical form to teaching engineering.

For myself, I cannot accept these assumptions. Agriculture is an art, and the Act of Congress of 1862 directed us to "teach the sciences related" thereto. To be sure we may speak of the theories of scientific agriculture as a science, but in order to

teach these theories as theories are taught in engineering courses we must give instruction not merely in "elementary chemistry" but in advanced chemistry, — the chemistry of the plant and animal, than which none is more profound; and what is true of chemistry is true of other sciences in their relation to the agricultural course. No student can be made properly to understand the facts of horticulture, of plant feeding, or of animal nutrition, until he is thoroughly grounded in the botanical, chemical, and physiological facts and principles underlying these subjects, and so, instead of teaching one science, we must teach several.

I do not see how it will ever be possible so to coördinate into a single science, for teaching purposes even, the mutual relations of physics, chemistry, biology, and physiology to the art of Agriculture, so that it will not be necessary to teach the individual sciences, unless the course in agriculture is made post-graduate. What then does the four years' course in agriculture become? Simply the teaching of a collection of sciences, along those lines which lead up to, and involve, a discussion of their application to the art of agriculture. When, therefore, chemistry, physics, botany, and physiology are taught in this relation, they do not lose their identity, but retain the same logical order which they have when taught as pure sciences, and they lend to the course in agriculture the teaching form which is considered so desirable.

As a matter of fact, four years' courses of agriculture, as now offered by some colleges, at least, are really specialized courses in the sciences, differing from the ordinary scientific course by pointing out the applications of the sciences to an art. Are such courses a mistake? Are they framed in accordance with false views? I believe not, and this is the reason for my belief: The real and important need of which the farmer is conscious, is for a knowledge of conditions, and not for methods or for skill in manipulation. When he clearly understands the reasons for that which goes on about him, the right method will appear. The difficulties lie with explanations, not with mechanical processes. And, besides, agriculture is not a business involving such delicate and intricate mechanical operations that attendance upon a college would be justified in order to learn them, although the modern dairy, the forcing house, and the fruit garden do require skill. But I venture to assert that no machines or practical methods have yet become available to the agriculturist, whose use the

clear-brained inmates of our farm homes have failed to master. The spraying of fruit with fungicides and insecticides illustrates how readily the necessary manipulation was acquired when the reasons for these operations became evident. It is the explanation of phenomena, then, which the extended course of study should give in order that the farmer may know how to adapt himself to the varying and complex conditions which he meets in his work.

The same educator, whose utterances I have called in question, has made other statements in his address which should not pass unnoticed. He declares that "arranging different courses of study, in a general agricultural course, is as nearly haphazard a process as anything can be in matters of instruction," and, that "certain text-books may be assigned to the senior year in one of these colleges, with absolutely no reason why they should not have been assigned to the freshman year, or, for that matter, to some year of the preparatory school course."

It would have been gratifying if President Murkland had illustrated this statement by specifying particular studies which are so devoid of relation to other subjects that their place in a course of study is in no way indicated, for then his meaning would be more clear. Did he have in mind the subject of tillage, which, unless considered in the light of the underlying principles of chemistry and physics, would be taught in a manner unworthy an extended course of instruction. Did he refer to the teaching of horticulture, which, to be intelligently and systematically done, must be based upon a previously acquired knowledge of botany? Did he mean the subject of plant nutrition, in which the instruction is always halting and unsatisfactory, if the student knows no chemistry? Or animal nutrition, to the proper consideration of which must be brought more than a smattering of chemical and physiological information? I believe I am fairly familiar with the list of subjects that could properly be placed in a four years' course in agriculture, and I know of no one which does not seem to have its position as closely indicated as is the case with many mathematical and language subjects, and with some subjects the logical order is almost imperatively fixed.

The statements and conclusions lead to a wide range of questions which we cannot discuss here. I will briefly notice one, however. Have the schools of lower grade and the short course in agricult-

ure, such as the "dairy course," no justification? They are abundantly justified both by what the four years' course has failed, and always will fail, to accomplish, and by the actual results which have followed their introduction. They are reaching young men who otherwise might never have had their thought stimulated to greater activity or their eyes fitted for larger vision. They are not ideal. They are not a full substitute for the four years' course, but I am of the opinion that as a means of carrying to the mass of farmers a higher appreciation of exact knowledge, they are likely to constitute the most efficient school effort that we are now attempting. I do most emphatically protest, though, against these briefer courses being regarded as an acknowledgment that the higher and fuller course lacks form and efficiency. The logic of such reasoning is not clear, and scarcely requires comment.

Passing now from that phase of our subject which relates chiefly to the college professor and the investigator, let us consider the need of conservatism in the interpretation to the farming public of its relation to scientific facts and theories. In this particular field of work, aside from the station bulletins, we have to do chiefly with the institute speaker and the editor.

In order that the farmer may be instructed and helped, and not confused, these two popular teachers should display a conservatism that is born of sound and adequate knowledge.

Institute speakers as we now find them include men of a great variety of experience. Today we listen to the man of science and tomorrow to the man of practice, both of whom have their peculiar place and value. It is extremely desirable, however, that the one shall not attempt to occupy the province of the other. While there is an occasional scientist who is familiar with the methods of practice, and a few who till the soil that have a fairly wide range of scientific knowledge, the rule is that the one falls far short of expertness in the domain of the other. It is better that the specialist in some line of agricultural practice shall not feel called upon to furnish a scientific explanation of all that he does, and that the speaker who is expert mostly in some departments of science shall not give too much free advice in regard to the details of farm work. Such a regard for the proprieties will tend to the establishment of greater confidence on the part of the public in those who appear in the capacity of teachers.

It is to be feared, moreover, that there is a tendency to gauge the value and efficiency of an institute speaker chiefly by his ability to amuse an audience, rather than by his credentials for sound and accurate knowledge. This is partly due to the fact that many audiences of farmers are better satisfied with amusement than with an address which requires close and earnest attention. It is certain, however, that just as we now confess the disaster due to the incapacity of religious teachers whose only claim to confidence is a sanctified ignorance, so we can be sure that glibness of tongue is not all the qualification which teachers in Agriculture should possess.

An error may be as effectually presented from the platform as a truth, but it is of vast importance to the hearer whether it be error or truth. A truth expressed in homely phrase is at least harmless and may be beneficial, but an error attractively uttered is always dangerous and may work injury. It is not an exaggeration to declare that some very grotesque science has been proclaimed at farm institutes by men who were out of their proper spheres of discussion, and who therefore lacked the exact knowledge necessary to accurate and reliable statements of a scientific character. This evil it is within the power of those who officially conduct public agricultural discussions to greatly remedy.

We will now consider somewhat briefly the relation of the press to scientific agriculture. What the agricultural editor most sorely needs is not only a conservative mind, but the ability to discriminate between the true and the false, — an ability which does not proceed from a ready and attractive style of writing or from what we in general term the art of journalism, but from a fund of information.

The number of agricultural papers, and papers which have an agricultural page, that are offered to the reading public, is legion. To some of these the farmer is greatly indebted. They are conducted by competent men, who summarize for the readers the best knowledge and thought that are current. Some of them, however, present an aggregation of fact and theory which is without form or comeliness when viewed in the light of truth. Especially remarkable, and to the informed mind exasperating, is the hash so often found in the agricultural page of the religious newspaper, put there, we suppose, because the editor feels it his

duty to illumine a benighted agriculture at the same time that he rescues an erring soul.

There is a great opportunity, though perhaps not yet a great demand, for men especially trained to be editors of agricultural newspapers. These should be men who possess the fundamentals of science and practice, and while they may not be experts in any one direction, they should be so well acquainted with the sources of knowledge and with the status of men and things that they can sift the chaff from the wheat.

This is not a plea for an aristocracy of knowledge based upon an orthodox training in school or out of school, or upon a required assent to the recognized *credo* of science or practice. It is not to be expected that even men of acknowledged authority shall all bring their views to the same dead level, but it would be a relief if we could eliminate from public discussion those speakers and writers whose chief claim to a hearing is that they disagree with the accepted verdicts of science and practice, not because they have had the opportunity exhaustively to examine the foundations upon which these conclusions rest, but rather because, after a superficial observation of the surface of things, they are not able to reach the same conclusions. The theories which these pseudo-scientists weave out of the tissues of their own brains, though generally short-lived, may not only mislead, but do great harm by destroying confidence in the science that is worthy of the name.

It may appear somewhat superfluous to suggest that there is need for conservatism on the part of the farmer, for he has been repeatedly pointed out as an example of excessive caution in the adoption of new ideas. Certainly he has sometimes assumed an attitude of even extreme reserve towards things scientific, and although the best farm practice furnishes abundant evidence that the discoveries of science have taken a firm hold upon the means and methods of agriculture, yet he is disposed carefully to question any new theories or change of practice that is presented to his attention. Such conservatism is wise. The farmer is receiving a great deal of free advice from a variety of sources, which, as we have tried to show, is not always reliable, and until by inexpensive experiments, or by less expensive observation, he secures reasonable proof of the value of a new method or appliance, he does well to adhere to his old and tried ways.

The peculiar characteristic pertaining to the farmer's conservative habit is that it occasionally suffers unfortunate and costly lapses. The owner of generous acres will often resist the teachings of science and experience, and will sneer at the advice of the ablest men in his own calling, only to grasp at the glib promises of the man he never before saw and of whose trustworthiness he knows absolutely nothing.

We find in farm homes, as we find everywhere, a strange expectancy concerning things new and untried. Humanity has always been hoping that out of the land of magic would come the relief from the burdens of life, or the promise and fulfillment of great rewards from little effort. The fraudulent food and fertilizer, the patent medicine, and the wonderful business opportunity which offers a chance to get something out of nothing, all exist because of this unconfessed faith in the extraordinary value of the unknown. It is this credulity concerning things outside the farmer's ordinary experience that renders it so difficult to defeat the schemes which only defraud.

It was not long ago that the farmers of New England paid forty dollars per ton for diatomaceous earth with which to strengthen the stalks of wheat. Even within a year some of our Maine farmers were almost convinced that a certain business concern had so interpreted Nature's methods that it had compounded a fertilizer of whose concentration of power the ordinary manufacturer of fertilizers never dreamed, and it was not easy to dislodge this half-formed confidence in a mixture possessing such unusual properties. Very recently, it was my own duty to warn the stockmen of my State not to put their trust in a certain class of foods, containing constituents of such pretended efficiency that their use would solve the difficulties of profitable stock feeding, by insuring the animals against disease and by stimulating growth and milk production to an unusual degree, and I have not found it easy to convince the public that the knowledge never possessed by the ablest veterinarians and that the food properties never discovered by science, nor revealed to previous human experience, are to be distrusted. Within the present year the efficient and courageous secretary of the Maine Board of Agriculture has had a sharp and prolonged contest with certain Western promoters, who for selfish reasons have been trying, with some degree of success, to convince the dairy-

men of Eastern Maine that through the investment of a generous sum of money they could accomplish results contrary to all business experience and the best knowledge, and he has found that he did not undertake an easy task. Gradually, to be sure, the agricultural public is becoming emancipated from the disastrous influence of the schemer, but there is still need that the Experiment Stations and Boards of Agriculture shall hedge about with all possible safeguards that class of workers who lack the expert knowledge necessary for detecting the false.

No one is infallible, no scientist has attained more than a very incomplete knowledge, and mistakes are a common experience, but we confidently assert that the highest realizations in agriculture lie in the conservative yet broadening influence of the scientific effort that is now being exerted in its behalf.

Discussion.

In the course of his lecture Professor Jordan remarked that underlying all practical matters are principles touching matters of investigation and education. No Experiment Station can ever exemplify, in that broad sense which is required, any new principle. Engineers make use of rules. A book of rules might be written which would be useful to this man but not to that.

He had met six or seven hundred Maine farmers, and their questions had not been how to hoe or shovel or run a machine, but, What is the reason for this or what is the cause of that? In a six weeks' winter course, to which any citizen might be admitted, thirteen boys attended, and were as eager for knowledge as the dry earth is for water. We cannot teach them everything, but can stimulate their thirst for knowledge. The course consisted of one hundred and twenty lectures.

Benjamin P. Ware expressed a sense of appreciation of the lecture. He was glad the professor had recognized the duty of Experiment Stations to protect the farmers. There is a degree of gullibility by which they are often misled; perhaps Yankees more than any other men hope to get something for nothing. The foundation of Experiment Stations was by reason of the imposition practised by manufacturers of commercial fertilizers. Farmers knew they must have something to add to their means

of fertilizing and jumped at the offer. Hundreds and thousands of dollars have been spent for ground oyster-shells and other worthless materials instead of ground bone. He rejoiced to know that though we have been so impatient for conclusions, and that Experiment Stations may have put forth premature results, yet they have effected great savings to the farmer. We now feed balanced rations to our stock; formerly we attempted to make milk from hay alone, and grain was looked upon as an extravagant luxury, but things are different today. Plants require balanced rations as well as animals, and Experiment Stations have taught us how to provide them by chemicals in due proportion.

Professor Jordan said that agriculturists are not the only class who need to attend to underlying principles. He was astonished at the ignorance of well-educated people in regard to common things. He spoke of a judge who would not recognize milk separated by separator as skimmed milk. He asked, How do we educate our farmers' wives? The boys are sent to colleges. Girls study mathematics, French, and the like, with only a little chemistry. When the new home is established, what does the mistress know? A cooking-stove will floor her; she knows nothing of bacteria or the effect of drafts of air, and puts food on the table of which she knows nothing. Children are less rationally fed than animals.

A gentleman told of a neighbor who in making up rations for cows omitted cotton-seed meal, as he was feeding for milk and not for meat. The speaker asked whether cotton-seed meal produces garget.

Professor Jordan answered that hundreds of farmers have been feeding cotton-seed meal for twenty years. Garget is generally caused by something wrong in the management of the cows.

The gentleman said he knew of a man who bought a cow that had been quarantined; he found her down, giving only eight quarts of milk daily; she afterwards rose to fifteen quarts per day. There is much testimony against the use of tuberculin; in many instances the value of cows has been lessened by the process.

Professor Jordan said that quite extended experiments with tuberculin have been favorable. After nine months animals

have been killed, and in each lung have been found encysted tubercles.

A lady said she thought it very shocking that so many of these beautiful animals should be sacrificed. She told of the cures of human consumption which she had seen at her home in Colorado, where the air is so pure and the conditions are so much better than in these coast regions. They never have diseased cattle there, and she did not think it impracticable to send cattle there to be cured.

Professor Jordan replied that he should like to place a few cows, with an incipient disease, under the conditions described.

Mr. Ware spoke of a man who had a cow which he knew was tuberculous; he sold her for ten dollars, and the purchaser took her to the commissioners, who paid thirty dollars for her. In another instance forty-five dollars was obtained for a twenty-dollar cow. Two years ago the owners got one-half the full value of healthy animals for all condemned ones. The law was amended, so that now the full value of a sound cow is paid; this seems to be a premium for rascality.

Thomas Harrison said that the commissioners are bound to compensate for the sacrifice of a cow for the public good.

Henry L. Clapp remarked that the more farmers talk the more they show that they have an eye to the main chance, which is quite right, and asked if this was not an element in the conservatism of farmers.

Professor Jordan answered that he thought Mr. Clapp had gone a little farther than he intended. In feeding or fertilizer experiments we are working with materials that we do not understand. He would not discourage the eye to the main chance.

Mr. Clapp thought boys are wanted to go into business as soon as possible, and their parents do not consider their environment.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 25, 1896.

A meeting for Lecture and Discussion was holden at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following is an abstract of a paper read by the author:

Stove Plants in their Native Tropics.

By Professor George L. Goodale, of Harvard University, Cambridge.

In the language of horticulturists, stove plants are those which require a high degree of heat and moisture for their most thrifty growth and their best estate. Without any exception worth mentioning, such plants are natives of the tropics, and it is the endeavor of cultivators to give them conditions of a tropical climate. But it must be clearly understood that within the tropics there are two distinct types of climatic conditions: one characterized by abundant moisture in the soil and atmosphere, and the other by great aridity. In fact, some of the larger deserts lie within the tropics, and yield to our greenhouses only a few plants from their oases. It is merely the difference in the amount of water that makes the difference between any oasis and the sterile waste around it. It is, therefore, only with the plants which are native to the moist parts of the tropics that we have to deal when we examine the vegetation that we confine to our hothouses or "stoves."

Near the equator there is a somewhat irregular and interrupted belt, which runs as a zone around the very warm, moist parts of the earth, and within this zone there is a nearly equable climate. North and south of it there is a dry season, followed by a rainy one, but in the equatorial belt one day is much like every other through the year. The temperature at night is always high enough to insure the best conditions for the growth of plants, and thus to utilize to the best purpose the materials which the green foliage has been preparing during the hours of daylight. Green plants are so many factories for the manufacture of starch and other food and building matters in their structure, and this work goes on only in the light. The only materials needed in this work are carbon-dioxide, commonly called carbonic acid, and water, with small traces of mineral substance, such as salts of potassium, calcium, and magnesium, together with more or less nitrogen.

It is plain that in the tropics, as in our best managed stoves, plants are well provided for all their wants, and all they have to do is to work in the sunlight, and grow at night. There are no climatic foes; all the foes are the competing plants, or the animals at every point. To compete successfully with the one and to resist the other, demands most varied forms and characteristics.

Hence in the tropics we find marvellous diversity of shapes and adaptations, and from this comes the difficulty of understanding that there is a unity which connects even the most varied forms.

The structure of plants may be illustrated by the architecture of buildings, in which the elementary factors are walls, floors, and roofs, to which we might add chimneys and windows. These are found in cathedrals and wayside shrines, in palaces and cottages; however much they may be disguised by decoration or by extrinsic additions of every kind, we can still recognize them and compare them with each other; we can penetrate the most complete disguise, and recognize them even when they have outlived their usefulness and exist only as ornamental vestiges, like make-believe chimneys or false windows. The recognition of these simple elements of architecture is not always easy, but it is always worth while, for we are thereby enabled to trace relations between the most widely separated structures, and to gain some insight into the order of their development. We can even see how the wayside shrine grew into a cathedral, and we can trace the steps by which the development has passed along its course. The recognition of these elements is of further use in such study, since it shows that form is, within certain limits, independent of material, and that whatever material is used must be so disposed that its burdens are kept within its strength. This illustration may now be applied to plants and their underlying architecture.

It is everywhere held truly by botanists that the different organs of all flowering plants are referable to root, stem, and leaf. Here we have the floor, the walls, and the roof. Perhaps root-hairs deserve the same rank, but for the present purposes we must restrict ourselves to the root, stem, and leaf, or even to the more essential stem and leaf.

This reduction of all parts of a flowering plant to such simple elements was the discovery, or rather inspiration, of the poet Goethe, who saw in a misshapen rose, with green leaves where there should have been fragrant petals, the reading of one of the riddles of nature. About the same time — the close of the last century — Auguste de Candolle, a botanist of the highest rank, was led by a careful comparison of the arrangement of leaves on stems with the parts of the flowers, to the conclusion that the flower is a shortened branch, with its parts arranged in an orderly manner, and adapted to special uses. At first botanists were

rather slow to make use of this clew through the otherwise trackless labyrinth of forms, but it is today in the hands of even the students of elementary botany, who can see in the fields of ripening wheat, with its ears of golden grain, leaves, and stems, and roots — all much diversified; and in the blue flax, the scarlet runner, and the rose, leaves and stems and nothing more; and so in all the kindred of those plants which luxuriate in the tropics.

Roots and stems are seldom so greatly disguised as to elude immediate identification, but sometimes leaves are so changed from the familiar type as to defy detection except after close study. But when we have made out the elemental parts and have reduced our otherwise bewildering complex fractions of the vegetable world to their lowest terms, we have before us the materials for working out the family history of plants. Before this subject was made clear by the luminous suggestions of Darwin and Wallace, the expression, "affinity in plants," was a figure of speech rather than an expression of an undoubted fact. How could this be otherwise when all held that species had come down to us in straight lines without any variation wide enough to carry one species beyond the limits which marked it from its nearest neighbors? But in the light of the hypothesis of derivation these lines are seen to be anything but straight: they are tortuous beyond belief, and in their irregular course mark the crooked path of descent.

Therefore, we hold now that these widely separated plants in all climates are, in the truest sense of the word, akin, and if we may borrow a phrase from the sister kingdom, they are of one blood. This belief lends a new charm to all examinations of the diversified organs of plants, and gives to botanical study the attractiveness which attaches to all life histories.

The lecturer next passed to new views acquired in regard to the structure of these plants. Everbody knows that plants are composed of myriads of minute compartments, different in shape and office, which are so combined as to make the organs and constitute the plant. In these compartments resides the living matter or the protoplasm, in which all life is manifested. Up to about fifteen years ago, it was held, on what was believed to be satisfactory evidence, that the living matter in each one of these cells or compartments, was quite separate from the living matter in

the contiguous cells, but better means of research and improved methods have shown that in some cases, and probably in all, the protoplasm in the cell communicates through an inconceivably fine, sieve-like partition with the protoplasm in the neighboring cells, and thus throughout the whole plant there is absolute continuity. Each plant, no matter how complex, is in all its living parts bound strictly together into a coherent coöperating whole.

The bearing of this on the question of propagating plants by cuttings or buds is very important. When a bud is transferred from one plant to another or to favorable soil, and there takes up its life as if it had not been severed from its source, it carries all its ancestral peculiarities with it. If, however, as in the case of the seed produced by the action of the pollen from one modified leaf, called a stamen, on the germ in the ovule or essential part of another modified leaf, there is lacking that close continuity — there is given a chance for variation to come in, and herein the seed differs from the bud. In this field of investigation much is to be done with respect to the perpetuation of acquired characters and those which are more obviously inherited.

At this point, said the lecturer, we may take in review the diversified plants of the tropics and note their peculiarities in their homes. But before passing to the illustrations we must note two points as of the highest importance. First, the showy plants in the tropics are much scattered and are not striking for brilliancy. If you want to see tropical plants at their best you must not visit a jungle, but must see such a stove as that of Mr. Hunnewell at Wellesley. Here, and in similar places, are gathered the treasures from many places in the tropics.

Again, in the tropics stove plants are not so thrifty as under the care of our most intelligent gardeners at the North. Here, under glass, all the caprices and eccentricities of plants are humored, and the plants consequently thrive better than they do where, in the tropics, they have to shift for themselves.

Professor Goodale gave a large series of stereoscopic illustrations of the finest tropical plants in their jungles and glens, and closed by deploring the fact that it is impossible, even in our largest Northern stoves, to bring the largest tropical plants to their finest and most characteristic condition.

The following were among the most striking of the very large

number of views of tropical plants shown by the lecturer. They are not here taken up in precisely the order in which they were exhibited. Palms were illustrated in great variety, both in their isolation and in groups. About twenty of the most prominent species were referred to in detail. Of the banana type, the most surprising was the traveller's tree at Singapore. Bamboos of all sizes were presented under their varied conditions. These and the climbers were of surpassing beauty and interest. Of epiphytic plants, aroids and orchids were shown as they occur in their native homes, and they served to emphasize the point made by the lecturer that in frequency of occurrence and in brilliancy, tropical blossoms, except on the tree-tops, do not compare with our north temperate vegetation. Perhaps the fruit trees of the tropics were as instructive to the spectators as any other of the illustrations exhibited, because in our stoves these so seldom come into bearing and are so seldom seen. The large number of pictures followed each other in very rapid succession, but with sufficient explanation to make them instructive and interesting.

Professor Goodale concluded by speaking of Berg's Physiognomy of Tropical Vegetation in South America, — on the River Magdalena and in the Andes of New Granada, which he had seen in the Library of the Society and which he recommended as a valuable supplement to his lecture.

BUSINESS MEETING.

SATURDAY, February 1, 1896.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The President, as Chairman of the Joint Committee on the Building, reported the following vote adopted by that Committee at a meeting on the 22d ult., a copy of which had been sent to every member of the Society, with notice that it would be presented at this meeting:

Voted, That the Joint Committee on the Building recommend to the Society that they give the said Committee power to offer the property now occupied by the Society for sale, provided that they can obtain a satisfactory price.

After a full discussion of the subject, by a large number of members, the following vote was passed:

Voted, That the Society adopt the recommendation of the Building Committee, and give that Committee power to act.

Charles E. Richardson, Treasurer, read his Annual Report, approved by the Finance Committee, which was accepted and referred to the Committee on Publication.

The following-named persons were appointed by the President a Committee on School Gardens and Children's Herbariums for the year 1896:

Henry L. Clapp, Chairman,

Mrs. Henrietta L. T. Wolcott,	Mrs. P. D. Richards,
George E. Davenport,	Miss Katharine W. Huston,
William P. Rich,	W. E. C. Rich.

It was moved that the President appoint a Committee of three to prepare a memorial of the late Charles M. Atkinson. The motion was carried, and the Chair appointed as that Committee Patrick Norton, Frederick L. Harris, and Kenneth Finlayson.

The same motion was made with regard to Hon. John P. Spaulding, and this motion also was carried, and the Chair appointed the Committee as follows: Joseph H. Woodford, Hon. George Heywood, and Edwin A. Hall.

A letter from Samuel Henshaw, Secretary of the Boston Society of Natural History, inviting the Society to attend a lecture by Herbert Lyon Jones on the "Biological Adaptation of Desert Plants to their Surroundings," before the Society of Natural History, on the evening of February 5, was read. It was voted that the invitation be accepted, and that the thanks of this Society be presented to the Natural History Society therefor.

Charles Wells Hubbard, of Weston,

having been recommended by the Executive Committee for membership in the Society, was on ballot duly elected.

Adjourned to Saturday, March 7.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 8, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

SEED CONTROL: ITS AIMS, METHODS, AND BENEFITS.

By GILBERT H. HICKS, of the Division of Botany, United States Department of Agriculture, Washington, D.C.

It seems like a waste of time to call the attention of the farmer, gardener, and fruit grower to the importance of planting good seed. From the remotest period it has been known that men cannot gather grapes from thorns or figs from thistles, and yet this is being attempted to a considerable extent in American husbandry every year.

Many farmers are dissatisfied with the low prices their products bring, with high tariffs and low tariffs, with the weather, and multitudinous other unfavorable conditions for profitable agriculture; yet only a few — a surprisingly small number — attach due weight to the fact that one of the very foundations of success for them is pure seed, germinable and true to name. It is unquestionably true that the present conditions in this country, including the sharp competition with both home and foreign products, render the profitable pursuit of agriculture exceedingly precarious, at least in many cases. I believe, on the other hand, that it is equally true that by proper attention to business, by using the best seeds, the best soil, and the best methods of cultivation and marketing, every farmer and gardener can make for himself a comfortable living and by proper frugality accumulate a substantial store for future necessities.

It is urged that there is already a plethoric yield of agricultural products, — more than our markets demand. While this may apply to inferior or mediocre articles, it does not hold good for those of the best quality. Every year sees a larger demand for first-class vegetables, fruits, and cereals. Americans of the present time are living more highly than they used to, and are willing to pay high prices for the best table luxuries.

The man who raises the best crops, then, is coming out away

ahead of his neighbors who are content to "make a living;" indeed, the time seems to be fast approaching in America when the husbandman who does not apply brains as well as fertilizers to his fields will not be able to make even a living.

The listlessness which exists in some quarters at present must give way to intensive application of the right sort. The trouble is not that the agriculturist does not work hard enough, but that in many cases his labors are misdirected and futile. Of what use is it if a man works a piece of ground early and late, in season and out, if he plants tares when he wants wheat?

Some of the conditions for successful crops are beyond the control of the producer, but such conditions are being gradually lessened.

In the matter of good seed it would seem at first sight that any one could obtain it by paying the price asked. Indeed, some American seedsmen would have us believe that it is difficult in this country to procure any other kind, — that all of the trashy seed of which we read is sold in Europe.

We wish to state at the outset that we have no grievance whatever against American seedsmen as a class; that the trade numbers as honorable men as can be found in any profession; and our remarks at this time will apply only to the abuses of the American seed trade, from the wholesaler down to the hardware merchant or grocer in a country village, who sells his customers old garden seeds that not even the trump of Gabriel could induce to come up.

It makes no difference to the farmer whether his seed comes directly from the large dealer or from the village merchant, if it does not germinate or turn out to be what he ordered. He does not stop to quibble over the point made by a recent writer in an American journal, that a man who sells bad seed is not a seedsman. If this be true, we shall have to get new names for the butcher who sells tainted meat and the grocer who adulterates his wares.

After a careful study of this subject, including the testing of a considerable quantity of seeds and conversation with some of our prominent seedsmen, I am prepared to state without fear of successful contradiction, what any one may easily find out for himself, if he takes a little trouble, that there is an immense amount of trashy and inferior seed sold in this country every year, and we believe the time is fully ripe for the inauguration of seed con-

trol methods in the United States. Such methods would benefit the first-class seedsmen fully as much, if not more, than the consumers themselves.

As it now is even the man who pays a high price for seed cannot always get it, though, on the other hand, it should be noted that some farmers get poor seed because it costs less than a good quality, and therefore they consider it cheap. No intelligent man needs to be told that such seed is dear at any price, and likely to entail a long series of losses from the fouling of his land and the introduction of inferior strains of agricultural plants.

Poor seed may be classified as follows:

1. Impure.
2. Not true to name.
3. Of low vitality.

Impurities may be either accidental, due to imperfect handling or cleaning, such as weed seeds, chaff, dirt, and foreign seeds; or the result of deliberate fraud, as "killed" seed, artificially colored sand, admixtures of seeds of inferior value, etc. If the impurity consists only of inert matter, *i.e.*, sand, chaff, and "killed" seeds, the wrong lies in the fact that the buyer pays for something which is of no value, but which cannot injure his land or crops. On the other hand, where seeds of weeds occur the farmer not only sows but carefully cultivates plants which are not only usurping the place of the crops he desires, but may even poison his family and stock. This last statement is an extreme case, but one not at all uncommon.

If the seeds are not true to name a great loss is entailed to the farmer from the fact that an entire crop, with all the cost and labor it implies, has been wasted. However, in cases of this kind, *e.g.*, if a gardener plants a field to some particular variety of radish and it turns out to be totally different from the kind ordered, the buyer has heretofore had redress by claiming damages against the seedsman for obtaining money by false pretense. Numerous cases of this kind have occurred in America, but dealers are usually careful to avoid such difficulties.

With regard to weed seeds, upon which much stress is laid by Seed Control Stations, it is possible that their baneful effects are sometimes overestimated by those forming an opinion on the value of commercial seed, judged from the standpoint of the

germination of the former. Experiments conducted with a few kinds of weed seeds tend to show that the seeds of some of our native plants produce a small number of seedlings as compared with those of cultivated plants. A large number of our worst weeds are perennial and, although they produce seeds, do not depend upon this method for self preservation; hence their seeds frequently show a small germinating capacity. A very large proportion of our serious annual weeds, on the other hand, produce enormous numbers of seeds, apparently upon the principle that, in some cases at least, but few of them will germinate. Again, the conditions of germination of many weeds seem to be different from those of cultivated plants, in that the seeds of the former often require a long period of rest, and perhaps, also, alternate freezing and thawing, before they will germinate.

However, in such cases, while the injurious effects may not be seen immediately, the weeds are likely to appear in future crops, when least expected. Professor Goff, of Wisconsin, found that seeds of "Redroot" (*Amaranthus retroflexus*) would not germinate at all when fresh, but after being kept for several years in a bag in a dry place they sprouted quite well.

On the other hand, Dr. J. C. Arthur, after conducting a test with various weed seeds at the New York Experiment Station in 1887, came to the conclusion that some species became incapable of germinating after being kept dry three or four months, and therefore he thinks that the danger of fouling land from sowing weed seeds with farm or garden seeds is not so great as commonly supposed. Seeds of Russian thistle, collected October 30, were tested in our laboratory the following May. After fourteen days but 15.5 per cent had germinated. Seeds of the same species one year and a half old failed to sprout at all during the same period.

The truth is that too little work has been done along this line to warrant any definite conclusions. There is a field for study here which is well worth the attention of those engaged in Seed Control. In general, however, it may be said that no seed should be sold which contains as high as five per cent of weed seeds.

In making reports on impurities, the European Seed Control Stations take into account the kind of weed seeds present in a sample. For example, in the Scandinavian Stations the following, among others, are reckoned as "bad" weed seeds: cockle,

chess, Canada thistle, dodder, wild mustard, sow thistle, creeping buttercup, wild chamomile. Such seeds, though they may be scarce in a sample, would readily spread throughout a field. In the case of dodder, Russian thistle, and some other weeds, no commercial seed is worth sowing if it contains a single seed of these species which is capable of germinating.

The third cause of poor seed, namely, low vitality, furnishes the greatest argument for seed control. In this respect the buyer, under present conditions, is most likely to be defrauded, and in such a manner that it is very difficult for him to obtain redress.

Most people judge of the germinating quality of seed from its appearance. If plump, sound, and glossy it is presumed to be germinable. Some go so far as to throw a handful of seed upon a hot stove; if it pops open suddenly it is supposed to be good. Others test their seed by placing a small quantity in water; if it sinks it is thought sound; if it floats it is considered dead. Neither test is at all satisfactory. In the latter case a layer of air closely enveloping the seed often keeps good seed afloat, while poor seed may sink as readily, since the specific gravity of seeds is greater than that of water.

The appearance of seed cannot be relied upon in forming an estimate of germinative ability. An artificial gloss is often given to seed in the process of cleaning. Modern seed-cleaning machinery is constructed not only to take out foreign matter, but also, in many instances, with attachments which clean the surface of the grains. The rubbing of the seeds together, of itself, gives them a glossy appearance. Sometimes polishing brushes are used with the express object of making old seed look like new. Cases are even known where seeds have been rubbed against oiled surfaces for the same purpose.

Without stopping here to discuss the subject of possible injury to the seed coat which any artificial treatment is likely to produce, — a belief which prevails among the best seedsmen of the country, for which reason such seedsmen do not use polishers, — it is evident that a glossy surface affords no certain criterion of the vitality of seed. Furthermore, there is not always strict uniformity in the color of seeds, even of the same variety. Dull-looking seeds often germinate better than shiny ones of the same species. Nevertheless it is true that some seeds, especially the

clovers, rapidly lose their bright color with age; hence in some instances the color test, to the eyes of an expert, is very useful. However, the most practised eye is readily deceived in this respect.

In the matter of vitality the buyer of seed is at a great disadvantage. The dealer usually claims that with proper conditions seed of a considerable age will germinate well. If one purchases seed and it does not come up, the seedsman coolly tells him that it was not the fault of the seed, but of the manner of planting, state of the weather, etc. Most of them in their catalogues take particular pains to emphasize this statement. The dealer says his seed is good, for he has carefully tested it and knows its viability.

Furthermore, the seedsman tells us that, on account of the lively competition in the trade, no man can afford to sell seed of a poor germinating quality, since he would lose his business. How is it, then, that so much badly germinating seed is sold to American farmers? This question is not so difficult to answer as one might think.

The seedsman is in the business for what he can get out of it; he has seed to sell, not to throw away. Like people in all other kinds of trade, he is often caught at the close of the season with much old stock on his hands. Does he test this at the beginning of the next season, and, finding that the germination has decreased ten or twenty, perhaps fifty per cent, sell it to the farmer at a corresponding reduction? There may be such instances, but they are certainly the exception and not the rule.

On the other hand, like a grocer or merchant in the same predicament, the seedsman frequently works off his old stock to the best advantage. This is a common practice, and it is no secret at all among the trade. One of the most prominent clover seed dealers in the United States admitted to me that he sold old clover seed in this way. In other words, if it was not too old he made no discrimination to ordinary customers, but if he found that its germinating power was pretty low he mixed it with fresh seed in whatever proportions it would stand. I have talked with quite a number of seedsmen in the country upon this point, and have yet to learn of one who throws away all of his old seed or sells it to the public at a lower price.

Of course, seedsmen themselves do not pay as much for old

seed as for new if they can help it, but in many cases no difference is made in the small lots sent out to the people, except that care is taken to mix in enough fresh seed to render the sample salable. This, to a large extent, accounts for the fact that rare vegetable and flower seeds often show a remarkably low vitality — a more or less frequent experience of every horticulturist and farmer. In ordinary seasons of business the common seeds move rapidly in trade, but the rare sorts are apt to be left over from year to year. The fact that such seed always costs more than the ordinary varieties makes the evil a very exasperating one.

To obviate, at least in a measure, the troubles arising from planting seed of low vitality, the seedsman frequently advises his customers to sow more seed per acre or rod than experiments have shown to be necessary if fresh seed were used. In fact, I may say, that with the present inadequate knowledge of seeds in this country, where the matter of prudence and economy has not entered into horticultural practices to the same extent as in Europe, there is very often an unnecessary waste in seed-sowing. Better pay more for good seed and sow only what is necessary. Labor will be saved both in the sowing and in thinning out the seedlings. This last point is a very important one where field or garden crops are raised upon a large scale.

If the seedsman would sell two pounds of seed which is fifty per cent below the proper germinating standard at the same price as one pound of standard seed, the dishonest practice — I call it by its right name — of selling low germinating seed would be greatly lessened, but such is not the case.

When seedsmen are asked to guarantee their seeds they make statements like the following (I am quoting now from the catalogue of one of the oldest and most reliable seed firms in the United States):

"Seeds of the best possible quality will fail through improper treatment. Thus, if a small seed be sown so deeply that the young plant cannot reach the surface, the seeds, however good, will fail. More failures result from a want of proper knowledge of conditions necessary to germination than from bad quality of seeds themselves. Besides the conditions" (which are stated) "affecting the germination of the seed, the young plants, after they have made their way to the surface, are liable to various accidents; a sudden current of very cold air, or a continued dry-

ing wind, may check their growth, or destroy the young plants altogether. In addition, there are numerous insects, both below and above ground, that may attack the plants, some of these being so small that they often destroy a crop before they are discovered.

"For the above reasons, we wish to state in this explicit form, that, while we exercise great care to have all seeds pure, reliable, and true to name, our seeds are sold without any warranty, expressed or implied, and without any responsibility in respect to the crop. If our seeds are not accepted on these terms, they must be returned at once."

The above is a fair sample of the kind of guarantees (?) offered by American seedsmen in general. Others, however, warrant seed to be of good vitality and true to name to the extent that they will refund money if not. Strange to say, however, the largest firms almost without exception expressly state that they will furnish no guarantee expressed or implied. But no guarantee from any firm whatever can take the place of an actual test made by a disinterested party.

No one asks the seedsman to guarantee a crop; that would be absurdly unreasonable. Neither, under seed control conditions, is it required that the seeds should come up after being planted in the field. As we shall see presently, in making germination tests the seeds are placed under the most favorable conditions and handled by experts from first to last, so that none of the common objections of seedsmen hold good, that no guarantee can be expected since "the very best seeds do not always give satisfaction on account of sowing too deep or too shallow; too wet or too dry soil; wet weather, cold weather, frosts, chemical changes induced by temperature, etc."

The conditions which affect germination are very complex, and the subject is a very interesting one, but we cannot treat it here. Suffice it to say that not only do different varieties of seed germinate best under conditions different from those of other varieties, but also that differences in season, climate, soil, and locality, difference in the degree of ripeness when harvested, and methods of harvesting and keeping, make it impossible to predicate with absolute accuracy how different seeds of the same variety will behave when they are planted. Nevertheless, the germination of our common garden and forage plants is sufficiently understood by

those who have made a study of the subject, to warrant the adoption of certain standards below which good seed ought not to fall.

As to the vitality of seed, it may be confidently stated that, with possibly a very few exceptions, the germinating power of all cultivated seeds deteriorates after the first or second year, and after three or four years, often after the first, this deterioration is usually very marked. In a few cases, such as cucurbits and flax, it is commonly supposed that seed of two or three years from harvesting is better than fresh. Dr. Wittmack says that the common grass seeds, if properly kept, retain their vitality two or even three years, although, as with clover, one year seed is preferable. He might have added, "if fully ripe when harvested," since most grass seed contains a large per cent of immature grains; a difficulty which is entirely unavoidable in many cases. Hard-coated seeds, such as the clovers and their allies, if kept in a dry place, usually retain their vitality better than seeds of a softer consistency.

Many vegetable seeds lose their vitality in a short time. Here, as in the case of all seeds, great variation exists. For example, in a large series of tests of vegetable seeds made by Professor Goff at Geneva, N.Y., in 1886, it was found that "two germinations of turnip seed seven years old gave ninety-eight per cent of growth, equaling the result to be expected from fresh seed; one sample nine years old, gave sixty-two per cent." But in the majority of instances, the old seed failed to come up well.

It is not necessary to take into account at all the supposed limits of vitality of the different varieties of seed in considering the subject of seed control. What matters it to the gardener if the highest authority in the world tells him that cucumber seed will germinate when it is ten years old, and the seedsman satisfies him that the seed is within that limit? As before stated, the only guarantee worth anything to the buyer is the result of an actual test made by a disinterested and competent person.

The necessity for seed control may be more obvious if we give the results of some tests. Although comparatively little attention has been paid to this subject in America, there are plenty of data at hand showing the need of practical reform in the seed trade.

The lowest vitality and purity is found as a rule among grass seeds, among which class of seeds detection of impurities is the

most difficult, not only to the purchaser, but also to the dealers themselves.

No grass is raised in the United States for seed alone, *i.e.*, on a commercial scale. Most of the seed of Kentucky blue grass, orchard grass, timothy, redtop, and meadow fescue used in this country is American grown. Some other species are raised here, to a greater or less extent, but in no case, so far as I have found, are these grasses cultivated for their seed alone, like a seed crop of peas or cabbage, for instance. This accounts for the fact that frequently large amounts of weed seeds are present in grass seeds. Generally no especial care is taken to rid the grass fields of these pests, and grass, above all other kinds of seed, is the most difficult to clean after it is once harvested. Besides, our meadows generally contain a mixture of various grasses, often of very different value.

Many grasses show an average germination of only thirty to forty per cent, — timothy, redtop, the bromes, orchard grass, the fescues, and a few others, being prominent exceptions. The conditions of the weather at the time grasses flower have a great deal to do with their germinative ability. If a prolonged wet season ensues at this time, only a very small percentage of the seeds ripen. For example: in Germany, in 1871, only five per cent of the seeds of meadow foxtail were germinable for this reason.

Again, the seeds on the same grass plant ripen very unevenly and, in many cases, rattle out easily when fully mature; therefore such seed is usually harvested before fully ripe. Besides, the glumes of ripe and unripe fruits are often so nearly alike in color that it is difficult for the collector to distinguish between them. Hence it is no wonder that pure and germinable grass seed is so hard to obtain. The cheaper grades are mostly chaff and dirt and worse than useless, while those designated "prime" and "fancy cleaned" are often of very little value.

Nevertheless the following table will show that grass seed of a high germinating ability may be obtained in our markets. The figures in the first column are quoted from the price list of a seedsman in the United States and are the results of germinating tests of seed offered for sale by him. It will be noted that these figures are in every instance considerably higher than those of the second column, which are the standards of germination used by Dr. Stebler, director of the Zurich Seed Control Station.

Grass Seed.	American Seedsman. Per cent.	Zurich. Per cent.
Redtop	95	85
Crested dog's tail	85	60
Orchard grass	95	70
Tall meadow fescue	90	70
Sheep's fescue	90	50
Italian rye grass	90	70
English rye grass	96	75
Reed canary grass	85	60
June grass	70	50
Rough stalked meadow grass	80	50

The seedsman adds, however, that these percentages are given as information only and not as a guarantee.

The purchaser ought not to suffer from the fact that, on account of the unfavorable conditions above mentioned, good grass seed is difficult to procure. The dealer should test his seed carefully, and sell it according to its real value. If the buyer is not willing to pay more for such seed than for trash, it is his own fault and he deserves no sympathy.

However, the buyer under present conditions is at a great disadvantage, as the following illustration will show: A sample of seed sold by one of the most prominent dealers in this country for yellow oat grass (*Avena flavescens*), was tested in our laboratory and found to contain 74.4 per cent of impurities, of which over four-fifths was the seed of common hair grass (*Deschampsia flexuosa*), the balance consisting mostly of chaff and weed seeds. Two hundred pounds of this seed was bought by the person who furnished the sample, at a cost of fifty dollars per hundred. Hair grass sells for about ten dollars per hundred pounds, and is practically worthless for lawn or pasture.

The grains of these two kinds of grass are very similar in appearance, and exceedingly difficult to detect without the aid of a lens. The seed of yellow oat grass is imported from Europe, where it is often deliberately adulterated with that of hair grass. It is not likely that the American seedsman noticed the fraud. Of the 25.6 per cent of pure seed, but 11.5 per cent germinated under the most favorable conditions, or a little less than 3 per cent of the entire sample. In other words, there was a loss of about ninety-one dollars out of the hundred which the seed cost,

allowing 100 per cent germination for the hair grass and supposing it to be of any value to the farmer. Of this loss nearly sixty dollars was, in all probability, the result of deliberate fraud upon the part of the European dealers, and reprehensible carelessness, to say the least, in the case of the American seedsman.

Kentucky blue grass showed but 10 per cent germinating power instead of at least 60 per cent, which is a fair standard for this seed. Only one per cent of a sample of Texas blue grass (*Poa arachnifera*) germinated. This grass, like the other Poas, usually shows a low germination, but in the case mentioned the sample was entirely worthless, since when sown in soil not a seed came up. Texas blue grass sells for three dollars a pound in small quantities, or two hundred and fifty dollars by the hundred. Out of four hundred seeds of Bermuda grass but one germinated, or one-fourth of one per cent. Although this grass rarely matures seed in the North, and is generally reproduced by its rootstocks, nevertheless good seed should show a germination of from 40 to 50 per cent, especially in view of the fact that seedsmen ask $1.50 per pound for it whether it comes up or not.

Orchard grass showed a germination of 31.8 per cent in blotters and 24 per cent in soil, as against 70 to 80 per cent, the proper standard. Tall meadow oat grass contained 36.3 per cent impurity, 70 per cent of which consisted of inferior grass seeds and weed seeds, the balance being chaff and dirt. Of the 64 per cent of pure seed 60 per cent germinated, or a little more than one-third of the entire sample.

Awnless brome should show a purity and germination per cent of 90 or 81 per cent intrinsic value. Five hundred pounds of this seed were purchased at regular wholesale prices and a sample submitted to us for test. It showed a purity of 80.8 and 55.5 per cent germination, being an actual value of 44.8, or a little over one-half that of the standard, a money loss of over forty dollars. This does not take into account the farmer's waste of time and labor, besides the injury to his land from sowing the inferior grass and weed seeds of which the impurities consisted.

Italian rye grass tested at the Iowa Experiment Station contained 41 per cent of English rye grass, an inferior plant. This seed comes from Europe and is very often adulterated in this

way. At the same station a pound of orchard grass was found to contain over fourteen hundred seeds of sheep sorrel, besides considerable ergot. Over one-half the bulk of a lot of fiorin (*Agrostis alba*) costing forty-two cents a pound was chaff, and over one-third its weight consisted of chaff and sand. All of the grasses enumerated were sold as good seed, at the regular market price, by prominent American seedsmen.

A test of orchard grass made at the Connecticut Experiment Station a few years ago furnishes a striking example of the need of seed control in this country. Seventeen samples, obtained from regular dealers, were examined. One of them contained no orchard grass at all, but consisted entirely of perennial rye grass, which is very unlike orchard grass, from which it is easily separated. This is an evident case of fraud upon the part of some one, since perennial rye grass is much inferior to orchard grass and costs considerably less a pound. Five other samples contained, on the average, but 25 per cent of orchard grass seed, and of the entire lot only 40 per cent germinated, or less than one-half the standard amount, while in one case the vitality was only 4½ per cent.

The following are the results of some germination tests made by American experiment stations: Redtop 4 per cent, beach grass 2 per cent, meadow foxtail 2 per cent, sweet vernal 5 per cent, tall meadow oat grass 2 per cent, yellow oat grass 2 per cent, soft chess 2 per cent, crested dog's tail 9 per cent, orchard grass 10 per cent, hard fescue 3 per cent, various-leaved fescue 3 per cent, meadow fescue 6 per cent, red fescue 8 per cent, slender fescue 3 per cent, Italian rye grass 4 per cent, English rye grass 12 per cent, reed canary grass 6 per cent, Canada blue grass 11 per cent, wood meadow grass 6 per cent, fowl meadow grass 3 per cent, rough stalked meadow grass 2 per cent.

In the following instances not a single seed sprouted: meadow brome, Schrader's brome, sheep fescue, velvet grass, timothy, water meadow grass, and Kentucky blue grass. We do not know under what conditions these tests were made, and have intentionally selected the minimum results for purposes of illustration, but they certainly afford abundance of argument for the need of seed control in America. The mere fact that such seeds were offered for sale in this country without the purchaser's knowledge

of their real worth is sufficient evidence that something needs to be done for the improvement of agriculture along this line.

Since so much of our grass seed comes from Europe let us turn in that direction for information. The following samples were tested last year at the Zurich Seed Control Station and include grasses from various parts of Europe. One sample of tall meadow oat grass contained 31.9 per cent of chaff. Of Italian rye grass one sample contained 85 per cent awnless seeds, a sure sign of intentional admixture with English rye grass. One sample of crested dog's tail consisted of 46.3 per cent English rye grass, 46.5 per cent chaff and dead grains, and only 7.2 per cent pure seeds; another sample contained 78.7 per cent of chaff and dead fruits. A sample of meadow foxtail contained 81.8 per cent chaff and larva-infested grains, while another one showed but 1 per cent germination.

One sample of tall meadow fescue showed 0 germinating per cent. Seeds of this grass are usually mixed with those of the common meadow fescue, but no particular injury is done, since both grasses grow in the same soil. The latter, however, is a less expensive seed.

Other fescues showed a remarkably low germination: sheep's fescue and various leaved fescue in one instance did not put forth a single sprout. Red fescue germinated in one case but 6 per cent. This grass is said to occur pure in the trade but seldom, being largely mixed with sheep's fescue and various-leaved fescue.

June grass showed the low purity of 28.5 per cent; germination 28 per cent. This grass is frequently adulterated with *Poa compressa*, which in Europe is considered inferior; in fact, one eminent authority classes it as a worthless weed. In America, however, it has some value, but flourishes on a different soil from June grass. Two samples labelled June grass contained 60 and 70 per cent *Poa compressa*.

Velvet grass was found in one instance to contain 96.5 per cent impurity, and one sample germinated but 17 per cent. Seed labelled sweet vernal in some cases proved to be almost entirely the annual variety, a very inferior, if not worthless grass. This adulteration is exceedingly common, and almost impossible to detect.

With the exception of the common meadow fescue and June grass, America depends almost entirely upon Europe for every grass mentioned above, and seeds as worthless as those enumerated are frequently sold in our stores. There is a law preventing America from sending bad pork and beef to Germany, but there is no embargo to prevent Germany and other foreign countries from dumping their poor seed upon our market, a practice which prevails to an alarming extent, accounting in a very large measure for the dodder, Russian thistle, and other dangerous weeds which infest our country.

Grass seeds are not the only ones which are apt to show very low germinating averages. Perhaps, on the whole, flower seeds are still more inferior in this respect. Here I wish to relate a personal incident by way of illustration. One of my very first recollections recurs to a time when my parents, who had gone to a neighboring village to make some purchases, took me with them. As we were leaving a "general" store, I found a ten-cent piece upon the floor. My people were poor, and this was the first money I had ever touched with my own hand, — almost the first I had ever seen. Taking it to the store-keeper he remarked that since the owner was unknown I was as much entitled to it as any one. I need not stop to tell you my feelings, which, however, doubtless those of you who were brought up in the country in humble circumstances can appreciate. Being very fond of flowers it did not take me a moment to decide what to do with the ten-cent piece. Standing before the counter with the most glowing feelings I had ever experienced I called for ten cents' worth of flower seeds. Selecting a package labelled "China Aster," I rode home with great expectations of the beautiful, large flowers which I should obtain from that seed.

My father, having been a practical farmer nearly all of his life, made a flower bed with the greatest care and planted the seeds with equal solicitude. Then I did what thousands of people do every year — waited for them to come up. This was thirty years ago, and not a single one of these seeds has come up yet. The keenness of my disappointment finally turned to disgust, from which I have never fully recovered.

The following germination tests of flower seeds purchased from prominent American seedsmen were made in our laboratory:

Ageratum conyzoides	11.5 per cent.
Double hollyhock	3.3 "
Fine mixed verbena	10.0 "
Japan primrose	0.0 "
Moonflower	0.0 "

A lot of seed bought by us and labelled *Salvia splendens* (scarlet sage) did not contain a single seed of that species. Nearly 85 per cent was seed of a much cheaper and less showy species, both seed and plant being very different from *Salvia splendens*, the seed of which costs about twelve dollars a pound at wholesale. The balance of the sample, 15 per cent, was discolored lettuce seed bearing a casual resemblance to the Salvia, but it had apparently been "killed" so that it did not germinate at all. The whole circumstance indicated deliberate fraud somewhere.

The main reason for the frequent poor quality of flower seeds is the fact that not rarely the same stock is offered for sale year after year. The custom of putting up flower and vegetable seeds in small packets and sending them out in boxes to small storekeepers throughout the country, accounts for a very large per cent of the seed that never comes up. Seed from these boxes is often offered to the public long after it is capable of growing. Much of the flower and vegetable seed received from abroad in bulk, and put up in this way after reaching America, is of a low vitality when our seedsmen get it, and does not improve by remaining in a country store a few years, nor even if it is returned to the seedsman each year, mixed with other seed and sent out in a new box.

Hon. J. J. H. Gregory, the well-known seedsman, in an excellent address delivered before this Society two years ago, speaking of the abuses of the seed trade, said that the agent of one firm acknowledged that a certain package of parsnip seed was on its fourth season's round, although this seed loses a great proportion of its vitality after the first year. He also mentioned a circular received by him thirty years ago from an agent of a firm in the box trade, offering certain varieties of vegetable seed at a wonderfully low price. The agent added that although the seeds were too old to sprout they would do to mix with new seed. Judging from some of the vegetable seed we have tested we are afraid that same agent is still in the business.

As you probably know, many of our varieties of vegetable seed, excepting peas, beans, cabbage, celery, cucumber, and onion, and perhaps a few others, are imported. Such seed, even if of good quality when shipped, sometimes becomes impaired in transit, from dampness or other reasons. On the other hand, on account of the absence of any plan of seed control in this country, the Europeans have an excellent outlet here for their cheap wares, a fact of which they frequently take advantage.

Owing to the methods of culture, as well as their size, form, and weight, vegetable seeds are usually much cleaner than those of grasses and other forage plants. Where seedsmen raise vegetables for seed purposes, they generally take particular pains to keep them free from weeds, a much easier task than in the cases of grasses, clovers, etc. Furthermore, seeds of grasses and forage plants, as a rule, are harder to clean. I am told, however, by one who has been in the seed trade for many years, that there is a good deal of fraud practised by mixing small gravel and sand with vegetable seeds to increase their weight, as such seed is generally sold in bulk by weight. Dirt is sometimes mixed with onion seed, and the excuse made when such impurities are detected that it is impossible to get all of the dirt and stones out of the seed.

Again, "dead" or "killed" seed is sometimes mixed with good seed. An instance, quoted to me by one who was personally acquainted with the transaction, related to a lot of vegetable seed which was received by a certain American firm. The seed proved to be a variety very inferior to that ordered. To make good the loss and avoid detection at the same time this seed was heated until the embryo was killed, when it was mixed with some of the genuine, higher priced variety, and sold as such. Similar instances are reported from Europe and are undoubtedly more common than is generally known.

A few years ago the Maine Experiment Station tested a considerable amount of vegetable seeds bought from American seedsmen. The following are the percentages of germination of seeds obtained from one dealer: Lettuce 0, turnip 4, cabbage 91, parsnip 0, celery 33, onion 0, beet 48, carrot 23, tomato 57, radish 80. Of the ten varieties tested three were entirely worthless, one nearly so, four others below the standard, one nearly up to the proper standard, while only a single variety of them all was what it should have been. I regret to say that in this case a Massa-

chusetts dealer sold the seeds. It is unnecessary to offer more proof that worthless seed is sold every year in American markets, a disagreeable subject and one which needs heroic treatment.

The important question is, What are we going to do about it? Shall we continue to believe that the evils will regulate themselves in the ordinary course of competition, as the seedsman would have his customers think? Experience with commercial fertilizers and adulterated food products ought to be sufficient to satisfy the most sanguine farmer or gardener, that competition among seedsmen is not going to insure him good seed.

More than a quarter of a century ago these same questions were forced upon the attention of European agriculturists as the results of some tests of commercial seed made by Dr. Nobbe, director of the Experiment Station at Tharand, Saxony. Seed control methods were introduced, and as the result there has been a great improvement in the stock offered for sale. Poor seed is on the European market, too, but no man on that continent needs buy it unless he wants to do so. At the present time there are over one hundred seed control stations in Europe, not a single important country being without one or more. Germany heads the list with 38, Sweden has 16, Austria 14, Belgium 9, Russia 7, and France, England, and Scotland one each. Even Japan, Brazil, and Java have one or more, the total number outside of the United States amounting in 1894 to 117. In some cases this work is conducted in connection with a regular agricultural experiment station; in many instances seed-testing alone is carried on. The general plans are similar, although considerable variation in details exists among the different stations. So far as I can learn, there are no laws in Europe compelling seedsmen to furnish good wares, but the result is reached through the pressure of public sentiment, due to the efforts of the Control Stations.

Frequently the work is undertaken in connection with agricultural societies, all of whose members share in the benefits. For example, every agriculturist in the jurisdiction of the Dresden Agricultural Society is authorized to send in to the Experiment Station at Tharand, Saxony, samples of seed bought by him, together with a statement of their origin and cost.

The sample must be taken and sealed before a witness and be a fair average representative of the seed purchased, so that the

dealer cannot dispute the result of the test. Of the smaller seeds, as radish, rape, clover, grasses, etc., at least one-half an ounce must be sent in, and in the case of larger seeds, as peas, beans, cereals, maize, etc., from a quarter to half a pound. The results of the tests are printed in the official journal of the station, which also publishes equitable standards of purity and germination, so that the people may know whether the guarantee of seeds offered to them is of a sufficiently high per cent.

Seed dealers or producers can have the purity and germinative ability of their seeds examined for one or two dollars, according to the size of the seed. Special arrangements are made with parties not members of the Dresden Agricultural Society.

The prices for seed testing vary according to the labor required and the country in which the test is made. A few of the stations are self-supporting, but most of them receive grants from the State to aid in carrying on the work. In many cases so-called "Control firms" are regular patrons of the stations. They pay a certain annual amount for having tests made. To their customers they furnish a guarantee for genuineness, purity, and germinating capacity based upon, but not necessarily equal to, the test made by the station for them, — the "preliminary test," as it is called.

Immediately upon receipt of the seed, the customer can send a sample to the Control Station if desired, and have it tested at a reduction of from one-third to two-thirds from prices charged the dealer, or, in some cases, without expense. This is called the "supplementary test."

The firm binds itself in case its seed falls 5 per cent or more below the germination per cent guaranteed, either to refund the money *pro rata* or to replace the goods, paying transportation both ways.

In supplementary tests made for members of the East-Prussian Agricultural Society, if more than 2 per cent of foreign matter occurs above the guarantee, or 10 dodder seeds per kilogram (about 4½ seeds per pound), the dealer agrees to take back the goods, paying charges both ways, or, at the option of the buyer, to refund from 5 to 10 per cent of the cost for every 5 to 10 seeds of dodder per pound.

Certain conditions exist relating to the amount of seed one must purchase to entitle him to free tests; also to the manner of

drawing and sending samples, limit of the time of the year when seeds can be bought under a guarantee, time for filing claims, etc. The methods of procedure are perfectly equitable for both dealer and buyer.

Not only the results of tests, but also the names of the seedsmen are published by the Experiment Station. This acts as a most wholesome check upon the sale of impure and ungerminable seed, and places the agriculturist in a position to protect himself effectually against the purchase of inferior stock.

The methods of testing seeds may be briefly touched upon. After the sample is received by the station a certain portion is weighed out as a smaller average sample. From this the good seed is carefully selected and the percentage of impurity ascertained. The impurity is divided into inert matter, seed of foreign cultivated plants, and weed seeds. The latter are identified by means of a type collection of seeds kept in the station laboratory.

From the pure seed are taken a certain number of average seeds for the germination test, which is usually conducted in a basement, where the temperature can be properly controlled. This is done by placing the seeds upon shelves in doubled-walled metal chambers, kept at a constant temperature by means of a thermo-regulator. At the Vienna Station the germinating chambers are heated with hot air. In others the cavity between the walls is filled with water kept at a temperature of 20 degrees C. (68 degrees F.). We find the latter method much preferable. Grass seeds are usually transferred for six hours each day to another chamber kept at 30 degrees C. (86 degrees F.), since this daily increase of temperature has been found advantageous.

The seeds are germinated upon damp cloth, asbestos, blotters, porous saucers, or soil. Genuineness of varieties is established by field tests. We make duplicate tests of 200 seeds each, and in most cases conduct comparative tests in blotters and soil at the same time, often supplementing these with greenhouse tests. In short, the seeds are germinated under the most favorable conditions for the particular species involved.

The seedsman is further favored by the fact that there is a considerable difference between germinative ability and *viability*. By viable seeds we mean those which come up through the soil when planted, while a seed is said to have germinated as soon

as the little rootlet called the radicle pushes through the seed coat.

No matter how favorable the soil conditions may be, very often a seed which would germinate upon a cloth or blotter will not come up through the soil from inherent lack of vitality alone. Of course a seed has no practical value unless it has energy enough to push its way up through the ground, but the very fact that seed planted in the open is subject to so many vicissitudes, coupled with the fact that the germination tests upon which guarantees are based are not made in the open ground, gives the dealer whatever advantage there is in Seed Control germination methods.

We do not wish to be unjust to the seedsmen, especially to those who are honorably endeavoring to build up a trade. There is one feature of the matter, however, which must not be overlooked. As stated at the outset, the American farmer of today frequently has an uphill task to make even a livelihood. Certainly he does not often declare large dividends. He has very scanty means under the present conditions of deciding whether the seed he sows, and upon which his bread and butter depends, is what it should be, until the best part of a season has elapsed and it is too late to remedy the effect of sowing poor seed.

How many, who sow grass seed for their meadows and lawns, know whether it corresponds to the name on the package or not? Many of the varieties are unknown to the seedsman himself unless he is an expert in the business, and even experts are deceived in this matter. The more common varieties of seed themselves are often unknown to the ordinary farmer and gardener. He buys his seed almost entirely upon the statements of the dealer, and the dealer is not always reliable.

A few days ago a sample of seed was submitted to me which had been purchased by a New Hampshire farmer for rye grass (*Lolium perenne*). It did not contain a single seed of that species, but every seed proved to be chess (*Bromus secalinus*)! Think of selling a man seed of one of the worst weeds he has to contend with — one which is already a vile pest on many farms! Every honorable person, be he a seedsman or planter, will join in demanding severe punishment of the perpetrator of deeds of this kind. When once awakened to the gravity of the situation, the American farmer will hold some one responsible for such dishonest

practices. No "non-warranty" clause of a seed catalogue will enable the dealer to shirk the responsibility of selling bad seed.

One of the most stupendous frauds in the seed trade relates to the pseudo-new varieties which are sent out with extravagant descriptions and under the most high-sounding names. Accompanying these there may be brilliant colored pictures, perhaps showing a sachaline plant, by whose side a man looks like a dwarf, or a melon too large to be gotten into a wheelbarrow. Generally these "golden-wonder," "mammoth early," sorts are old and well-known varieties sailing under false colors. The experienced gardener may not be deceived by such representations, but other people are. Oftentimes it is largely the buyer's fault, to be sure, since a large number of people seem to delight in being hoodwinked, and will eagerly purchase seed when twenty or thirty packages are offered for one dollar, or four for a quarter, regardless of the fact that they are likely to be cheated in the transaction.

A few weeks ago a case was before the Supreme Court, at Long Island City, N. Y., in which some celery growers sued a seedsman for six thousand dollars damages. They had purchased seed under the name of "golden self-blanching celery," but it turned out to be some kind of wild celery, resulting in an entire loss of the crop. The seed had been sold under the so-called "non-warranty" provision of the seed catalogues which I have already given, hence the Court ruled that damages could not be allowed. The trade journal reporting the case says that the result is hailed with great rejoicing among seedsmen, as no doubt it is, for it means, unless some just seed control laws are enacted in this country, that the gardener, horticulturist, and farmer will have no protection whatever against the abuses of the seed trade.

The dealer claims that he cannot be reasonably required to warrant a variety of seed true to name, since cultivated plants often revert to their native state. If this excuse be valid, the seedsman ought to advertise such varieties as possible reversions to the original stock. He cannot throw the blame upon the grower, since it is the seedsman's business to know that the seeds he sells are genuine, pure, and germinable, and it should be the privilege of the planter to have reliable information upon the same points and in all cases. This is the object of seed control.

Whether seed control methods are adopted in this country or not, every buyer should have some reliable way of ascertaining the value of his own seed. Purity tests will probably not be difficult to make, except in the case of grasses. To identify these will give even the skilled buyer some trouble. If there are no scales within reach, the percentage of impurity can be estimated fairly well by measuring the bulk of pure and impure seeds, though weighing is a much more satisfactory method. In making germination tests, an average number of large, small, and medium-sized seeds should be selected in lots of one or two hundred for each test. In regular seed examination, two lots of two hundred seeds each are usually chosen. Sometimes lots of three hundred are used, the idea being that the larger the number of seeds taken, the smaller will be the chance of error. For practical purposes one hundred will do very well, especially of the larger kinds, as corn, oats, melons, etc.

Since the principal factors affecting germination are heat, moisture, and air, it is necessary to provide proper amounts of each. Seventy degrees Fahrenheit, which is about the temperature of an ordinary living-room, will do very well for most seeds. The supply of a suitable amount of moisture is a more difficult problem than that of temperature, since seeds vary greatly in the amount of moisture required for germination. In general, it may be said that large seeds and those with hard coats will stand more moisture than smaller ones, but different kinds of seed vary so much upon this point, that no safe rule can be given.

Perhaps the plate method is the handiest way of making home germination tests which will prove at all serviceable. This consists in the use of two folds of white flannel cloth, thoroughly wet, between which the seeds, having been carefully counted out, are placed. A soup plate covered with a common dinner plate is used for holding the outfit. The cloths will need to be freshly moistened two or three times a week, according to the dryness of the atmosphere where the plates are kept.

Other simple appliances have been recommended for home testing, such as porous flower pot saucers placed in pans containing water; plates set in similar pans and holding cloths which dip into the water so as to keep the moisture constant, etc. Probably the surest way to ascertain the germinating power of seeds is to sow them in soil in a flower pot (or, preferably, a

"flat"), covering them very lightly with soil or fine sand, and keeping the pots closed to retain the moisture. Seeds cannot be examined so well from time to time, however, if this method is adopted.

In making tests the seeds should be looked over every day, those which have sprouted being removed, and a record kept of the same. At the close of the test, the hard seeds remaining should be cut in two with a sharp knife, to ascertain whether a live germ is within. In such cases due allowance should be made, as a certain per cent of these seeds would probably have germinated in a longer time.

Ten days is sufficient for testing the germination of the cereals, clovers, and most vegetable seeds, except beet and carrot, which require at least fourteen days. The majority of grasses need twenty-one days; timothy and rye grass, however, require but fourteen, while the Poas need twenty-eight days. Tree seeds require from twenty-eight to forty-two days, or longer, and special germination methods. There is usually enough air within the seed or immediately surrounding it, to suffice for the mere act of germination, which is all we are concerned with at present.

Each kind of seed is said to have a certain germinative energy, by which is meant the period required to sprout one-half or more of the seeds of a fresh and good sample of that species. This period varies from three to seven days in most commercial varieties, and is a matter of considerable importance, especially where a prompt decision is wished on the supposed germinative value of a sample under consideration. For example, if a certain lot of radish seed does not show fifty per cent of germination within three days, it is probably old seed. Likewise, if seed begins to get mouldy after a few days' germination trial, it may be pretty safely set down as old stock, provided the test has been properly conducted.

However, no system of private seed inspection or testing, either by the dealer or grower, can secure the end desired; namely, accurate information as to the quality of all seed offered for sale, as well as the exclusion of wares containing seeds of weeds which would prove a serious menace to agriculture.

The seedsman may test his seed with the utmost care, as many do, but so long as he furnishes no guarantee to the buyer, such

tests are not necessarily of any value whatever to the latter. On the other hand, neither the seedsman nor the buyer would have equally as good facilities for testing seeds as a Control or Experiment Station devoted entirely to that purpose.

With our present system of State Agricultural Experiment Stations it seems as if seed control work in this country could be best undertaken by some of them. The Department of Agriculture stands ready to furnish any assistance along this line which properly comes within its province.

A few of our stations have paid some attention to the testing of seeds, particularly the North Carolina station, but no definite control has yet come from it. A course on practical seed-testing should be given in all our agricultural colleges, as there is great need in this country among farmers and others for a good knowledge of seeds, further than that which is now furnished almost exclusively by seed catalogues, — a very dubious source of information in many cases.

Practical lectures along this line should be given at farmers' institutes, before agricultural and horticultural societies, etc., until the farmer and gardener become alive to the importance of the subject and the need for some system of Seed Control.

I would like to see this Society take steps for the introduction of Seed Control measures within this State, perhaps asking the Legislature to appropriate an adequate sum for equipping and conducting a Seed Control Station, at the same time requiring dealers to furnish their customers with a guarantee of the germination and purity of all seeds sold by them.

It is not likely that such a bill would be passed without great opposition from the petty dealers and quacks in the seed trade, for it would be a great blow to their operations. On the other hand, although the cost and trouble involved might inconvenience the honorable seedsmen more or less at first, there is no question that in the end such seedsmen would be greatly benefited along with the farmer and gardener, and it is for the best interests of the trade as well as the vast army of seed planters in this country that we make this plea for seed control in America.

In this paper we have not had time to deal with the importance of grading seeds according to size and weight. As a usual thing no attention is paid to this matter in the seeds offered to home buyers. When clover seed, for instance, is shipped abroad, our

exporters are required not only to equal the sample furnished in purity and germination, but it must be up to a certain grade in size. Foreigners recognize the fact, which our people have scarcely begun to appreciate, that there is a great difference in the value of seed wares, even in the matter of size alone, large seed as a rule producing better plants. Seed selection, however, is a great subject by itself and merits special attention at some future time.

Here I wish to reiterate and emphasize the statement made at the outset, that in speaking today of the evils of the seed trade, no matter what impression our remarks may leave, we have no reference at all to the honorable dealer, by whom we mean the seedsman who is not guilty of any of the fraudulent practices mentioned herein. We leave to others judgment on the man who sells bad seed through ignorance or carelessness, instead of intent, recalling, however, the common principle that "ignorance is no excuse."

In conclusion we will state a few benefits of seed control, among the many which might be given:

1. Seed control would furnish reliable and non-partisan information of the real worth of commercial seeds.

2. The publicity given to the tests would act as a great incentive to dealers to furnish only good seed.

3. The honorable seedsman would be protected against the dishonorable dealer with whom he is now obliged to compete.

4. The farmer, gardener, and horticulturist could ascertain, free of cost, or for a small amount, the value of seeds purchased from dealers connected with the seed control.

5. The impositions which are now frequently practised by seedsmen upon the ignorance and credulity of their customers would be greatly diminished.

6. A universal and thorough system of seed control in America would lessen in a great measure the importation of bad weed seeds.

7. The interest awakened among farmers and others in a practical study of seeds, together with the knowledge upon the subject disseminated by the stations, although a secondary benefit, would be of immense value to American agriculture and horticulture.

DISCUSSION.

Mr. Hicks illustrated his lecture by four charts.

(1.) Cotton seed and its germination.
(2.) Grass "seed" adulterations.
(3.) Commercial grass "seed."
(4.) Red clover seed and its principal impurities.

William C. Strong said that he had had painful experiences with seeds and could see a great difficulty in the matter of guarantees; it is a hard question for seedsmen. He had had weeds come up with his seed, and feels that we ought to take some action. He requested Mr. Hicks to tell exactly what ought to be done.

Mr. Hicks replied that after briefly stating the necessity to the Legislature, an appropriation ought to be asked for (probably not more than three or four thousand dollars would be needed for this purpose) to start a Seed Control Station. Such a station could be managed either in connection with this Society or some other good horticultural or agricultural society, or by the State Agricultural Experiment Station. Experiment Stations do not receive money enough to carry on this line of work to any extent, but they usually have experienced men, greenhouses, etc., which would make them the best places for the location of seed-testing stations. The sale of seeds containing dodder, Russian thistle, and similar pests, should be prohibited by law. A general law that no common seed should contain more than five per cent of impurity should be established. As the germinative capacity of seeds cannot be determined by mere inspection, dealers should be required to have their seeds tested and should state the percentage which will vegetate, a certain amount being allowed for variation in tests, and should fix their prices accordingly.

Robert Farquhar wished a lecture like this could be delivered before every farmers' institute in the country. Some farmers, he said, do not appreciate the cost of producing good seed. A very interesting lecture could be given on the methods used by good dealers in testing. The impression may have gone abroad that no seedsman could be sued, but such is not the case. A farmer bought two pounds of Purple-top Flat turnip, and said it produced Ruta-baga turnips. Mr. Farquhar proved that his seed had never been sown, but Ruta-baga had. The duty of every

seedsman is to sell seed of the best quality. If seedsmen knew that their seeds would be tested and advertised it would tend towards purity.

Hon. James J. H. Gregory spoke of the risks and cares of the seed business, and the wrong impression often drawn by the planters, who frequently accuse the seed-grower unjustly for failure caused by their own mistakes. First-class seedsmen have to, and do, both as a matter of conscience and business wisdom, destroy a great quantity of seed on account of low vitality; seeds are not like grain, and are never graded; if they were, they might be sold at lower prices. Onion seed some years is as high as ninety-five per cent in germination; other years seed of the same varieties, though quite new, is very poor in germinating quality. Old seeds will sometimes push out a root, and go no further. Tests under cover are not like tests outside. We want to encourage public sentiment for good seed. The many risks incidental to the business all show the advantage of seedsmen growing the seed they sell. We cannot believe that seedsmen, as a rule, sell worthless seed.

Varnum Frost thought a great deal depended on the persons sowing the seeds. The nature of the seeds must be known, and the conditions should be favorable for seed to germinate. Seeds of Cucurbitaceous plants, such as the melon, squash, and cucumber, require different soil temperatures and degrees of moisture from those needed by dandelions, lettuce, peas, celery, and beets; the latter class do better in lower temperatures with more moisture. Weather conditions contribute more to the germination of seed than anything else. In conclusion, after fifty years' experience he said he would not dare to sell seed which he had grown himself under the best conditions, to persons who do not understand the requirements of each kind of seed, if he had to guarantee them. Under no circumstances could a man do business on this plan.

Mr. Hicks made a point that a great deal depends on the methods of sowing. Testing, however, should not be left entirely to the farmer or to the seedsman. Trained and efficient persons connected with a station thoroughly equipped for the purpose, should conduct impartial tests in the laboratory, in the greenhouse, and outdoors. Some kinds of seed will not germinate well in cloth. June grass comes up best in the soil.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 15, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

ON SOME SCALE INSECTS.

By L. O. HOWARD, Chief of the Division of Entomology, United States Department of Agriculture, Washington, D.C.

All over the country orchardists are now greatly interested in the subject of scale insects. This revival of interest in these creatures among growers of deciduous fruit trees in the East is largely the result of the establishment in this part of the country of the San José scale. Other species, however, have become prominent of late, and general treatment for scale insects is gradually becoming one of the elements of successful apple, pear, and peach growing. One of the principal and most fortunate results of this appearance of the San José scale in the East — if such a disaster can be called fortunate from any point of view — is the direction of the attention of all persons interested in, or in any way connected with, fruit and shade or ornamental trees, towards the great evils which are liable to be brought about through the distribution of diseased stock by nurserymen, and towards the whole subject of legislation against injurious insects. It is my purpose in this paper to lay before you some of the facts concerning the most important of the scale insects which are to be found, or are liable soon to occur, upon your fruit and shade trees; to discuss to some extent the matter of remedies; and to dwell more particularly upon the two great questions referred to.

The State of Massachusetts is rather fortunately situated with regard to injurious insects, and the methods of cultivation generally adopted are advanced in their character. Clean cultivation is the rule, and horticulturists are an exceptionally intelligent class of people. Holdings in general are small, and the State is far enough north to escape many of the most important insect pests. Even Massachusetts trees, however, suffer from the attacks of a number of injurious species, and there are still others which are as yet to be found here in small numbers only, whose increase is to be guarded against; and others, again, which are

liable to be introduced into the State upon nursery stock, and which will certainly flourish here if once introduced.

In speaking of the State of Massachusetts as a whole it must be remembered that the same conditions do not prevail over the entire State. You have a double watershed from an elevated north and south ridge, passing through the vicinity of Worcester, sloping gradually towards the eastern seacoast in one direction and towards the valley of the Connecticut river in the other. West of the Connecticut river there is a more abrupt rise to the Berkshire hills, and thence a descent of almost equal abruptness to the valley of the Hudson river in New York. It results from this conformation that more southern forms are found in a comparatively narrow strip up the valley of the Connecticut river and to a lesser extent up the seacoast, than in other and more elevated portions of the State; and experience has shown that certain insects will establish themselves in these strips which will not continue to reproduce and multiply when accidentally introduced into other Massachusetts localities. This principle, which is now fairly well established, has especial significance in considering the question of the possible future damage in Massachusetts by two of the most important scale insects injurious to fruit trees; I refer to the San José scale and the so-called West Indian peach scale. So far as our experience goes (and this experience may be said to be based upon more than negative evidence) neither of these species will prove itself especially injurious in regions which belong to the transition life zone, which includes all of Massachusetts except the strip mentioned. It is even likely that both species will die out if introduced at any point in this life zone.

The San José scale, as you know, was brought from California on the Kelsey plum, to two large nurseries in New Jersey — those of Parry Bros., at Parryville, and J. T. Lovett, at Little Silver — in 1886 or 1887. The trees were undoubtedly thoroughly infested when received; did not thrive; and in both cases most of them were ultimately taken up and destroyed. The stock, however, had been multiplied by nursery methods, and from the original stock and that subsequently obtained, the scale spread more or less completely through both nurseries in question. Now, from that year until 1893, both these nurseries (and as you know, both, during that period, did an enormous business) sent

out nursery stock north, south, east, and west, and a certain proportion of this stock carried upon it the San José scale. The scale was not recognized until the summer of 1893, when I found it upon some pears from Charlottesville, Va. Since that time my investigations have resulted in the ascertaining of nearly two hundred points in which the scale has established itself and become destructive. Not one of these points is in territory which clearly belongs to the transition life zone, and yet who can question the statement that thousands and thousands of young trees bearing this scale must have been sold to fruit growers located within this region, and have been planted by them.

Even considering the San José scale by itself, the evidence is entitled to great consideration, and to my mind is sufficiently strong to form a basis for a guarded prediction. But it must be further remembered that this is but a single instance among very many known to us, and that it is upon the mass of facts we are basing our knowledge of the indications of the general laws which govern the geographical distribution of species.

There are, however, localities in your State where the San José scale and the West Indian peach scale are liable to do great damage, and it thus becomes necessary for fruit growers to inform themselves about both species. I have now in proof a complete bulletin referring to the whole subject of the San José scale, which it will give me pleasure to send to any members of this Society who care to apply for it, so that it will not be necessary here to treat of this insect at any great length.

The life history of all scale insects may be briefly summarized very much as follows:

The eggs are laid by the adult female either immediately beneath her own body or at its posterior extremity. Certain species do not lay eggs, but give birth to living young, as do the plant lice. This abnormal habit is not characteristic of any particular group of forms, but is found with individual species in one or more genera. The young, on hatching from the eggs, are active, six-legged, mite-like creatures, which crawl rapidly away from the body of the mother, wander out upon the new and tender growth of the tree, and there settle, pushing their beaks through the outer tissue of the leaf or twig and feeding upon the sap. Even in this early stage the male insect can be distinguished from the female by certain differences in structure. As

a general thing, the female casts its skin from three to five times before reaching the adult condition, and beginning to lay eggs or give birth to young. With each successive molt the insect increases in size and becomes usually more convex in form. Its legs and antennæ become proportionately reduced, and its eyes become smaller and are finally lost. As a general thing it is incapable of moving itself after the second molt, from the spot where it has fixed itself, although certain species crawl throughout life. The adult female insect, then, is a motionless, degraded, wingless, and, for all practical purposes, legless and eyeless creature. In the armored scales she is absolutely legless and eyeless. The mouth parts, through which she derives nourishment, remain functional, and have enlarged from molt to molt. Her body becomes swollen with eggs or young, and as soon as these are laid or born she dies.

The life of the male differs radically from that of the female. Up to the second molt the life history is practically parallel in both sexes, but after this period the male larva transforms to a pupa, in which the organs of the perfectly developed, fledged insect become apparent. This change may be undergone within a cocoon or under a male scale. The adult male, which emerges from the pupa at about the time when the female becomes full grown, is an active and rather highly organized creature, with two broad, functional wings and long vibrating antennæ. The legs are also long and stout. The hind wings are absent, and are replaced by rather long tubercles, to the end of each of which is articulated a strong bristle, hooked at the tip, the tip fitting into a pocket on the hind border of the wings. The eyes of the male insect are very large and strongly faceted. The mouth parts are entirely absent, their place being taken by supplementary eye spots. The function of the male insect is simply to fertilize the female, and it then dies. The number of generations annually, among bark lice, differs so widely with different forms that no general statement can be made.

As a general rule scale insects have been divided, both from the classificatory standpoint and from the standpoint of practical remedial treatment, into those which are armored or secrete scales over their bodies, and those which are naked and have no differentiated scale. From the practical standpoint, however, this division is of no great use, since even the so-called naked

scale insects become so hard-bodied, and their integument is composed of such solid chitine, that they are practically as resistant to the action of washes as are those species which have a dense scale of wax. A better classification, when we are considering the matter of remedies, is to divide the group into those species which give birth to living young and those which lay eggs. The object of this division will be at once apparent. Those scale insects which give birth to living young, drop a number of young per day for a comparatively long period. Those first hatched become resistant to the action of washes within a few days, so that at no one time do we have even a majority of the insects in the young and unprotected condition in which washes, weak enough to do no damage to the foliage, will kill them. With the scale insects which lay eggs, on the contrary, there is a more or less definite hatching period. In other words, all the eggs in a given generation hatch at approximately the same time, and the majority of the young are in a condition to be killed by weak washes at about the same time. The species that give birth to living young can therefore be treated to advantage only in the winter, when there will be no danger of injuring the foliage of the trees by the action of washes which are strong enough to kill the insects under their scales. The best example of this class is the San José scale. The egg-laying species, as exemplified by the common oyster-shell barklouse of the apple, pass the winter (most of them) in the egg condition under the old mother scales. They hatch, approximately all together, the latter part of May or in June, and at this critical time may be destroyed by the dilute kerosene emulsion.

Let us hurriedly, then, take up a number of species, all of which Massachusetts fruit growers should know. But a few words need be said about each, since the illustrations on the screen and the specimens which I shall exhibit afterwards, will convey a more definite idea of the appearance of the insects than any words of description.

The lecturer next gave a brief account of the following species, of some of which engravings from the publications of the Department of Agriculture are here presented :

The San José scale (*Aspidiotus perniciosus*), Fig. 1.

Oyster shell barklouse of the apple (*Mytilaspis pomorum*), Fig. 2.

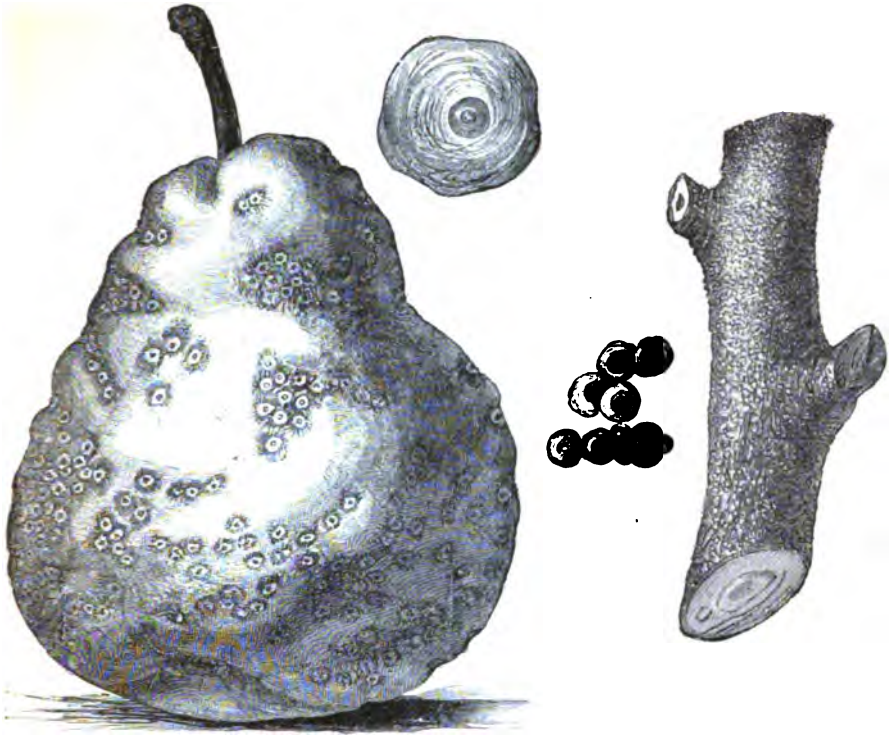

FIG. 1. — *Aspidiotus perniciosus* (The San José or Pernicious Scale), on pear fruit and twig, with enlarged male and female scales. (*From U.S. Dept. Agric.*)

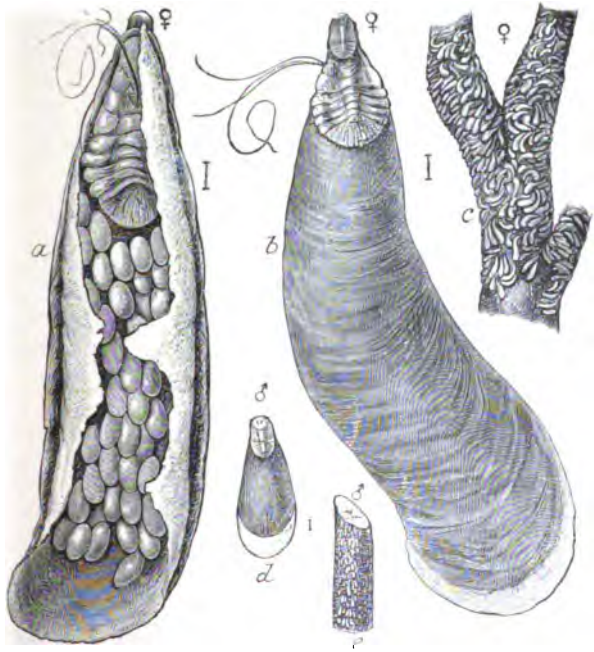

FIG. 2. — *Mytilaspis pomorum* (The Oyster-shell Bark Louse): *a*, female scale from below, showing eggs; *b*, same from above — greatly enlarged; *c*, female scales. (*From U.S. Dept. Agric.*)

FIG. 3. — *Chionaspis furfurus* (The Scurfy Bark Louse): *a*, *c*, females; *b*, *d*, males — *a*, *b*, natural size; *c*, *d*, enlarged. (*From U.S. Dept. Agric.*)

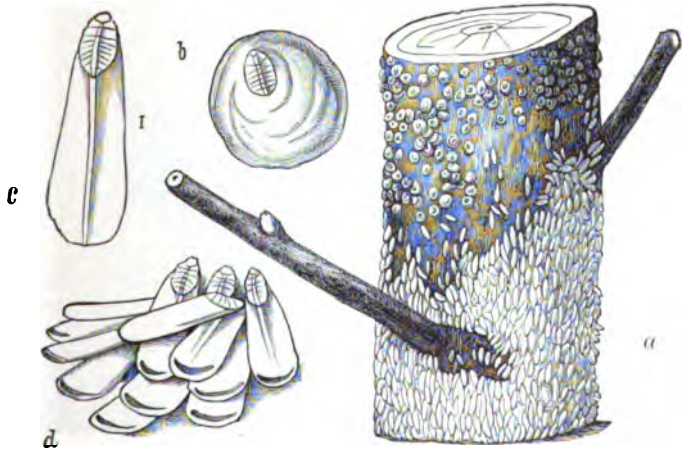

FIG. 4. — *Diaspis lanatus* (The New Peach Scale): *a*, branch covered with male and female scales — natural size; *b*, female scale; *c*, male scale; *d*, group of male scales — enlarged. (*From U.S. Dept. Agric.*)

FIG. 3. — *Chionaspis furfurus* (The Scurfy Bark Louse): *a*, *c*, females; *b*, *d*, males — *a*, *b*, natural size; *c*, *d*, enlarged. (*From U.S. Dept. Agric.*)

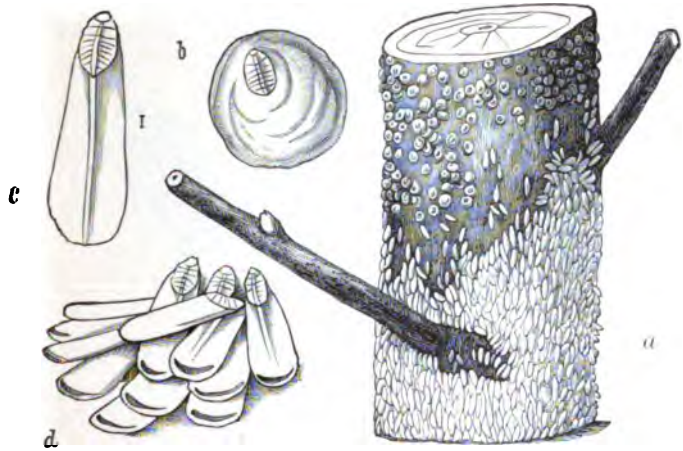

FIG. 4. — *Diaspis lanatus* (The New Peach Scale): *a*, branch covered with male and female scales — natural size; *b*, female scale; *c*, male scale; *d*, group of male scales — enlarged. (*From U.S. Dept. Agric.*)

FIG. 5. — *Diaspis rosæ* (The Rose Scale) : 1, natural size on twigs; 1*a*, female scale — enlarged; 1*b*, male scale — enlarged. (*From U.S. Dept. Agric.*)

FIG. 6. — *Chionaspis euonymi* (The Euonymus Scale) : Scale natural size on leaf and twig; *a*, male scale — enlarged; *b*, female scale — enlarged. (*From U.S. Dept. Agric.*)

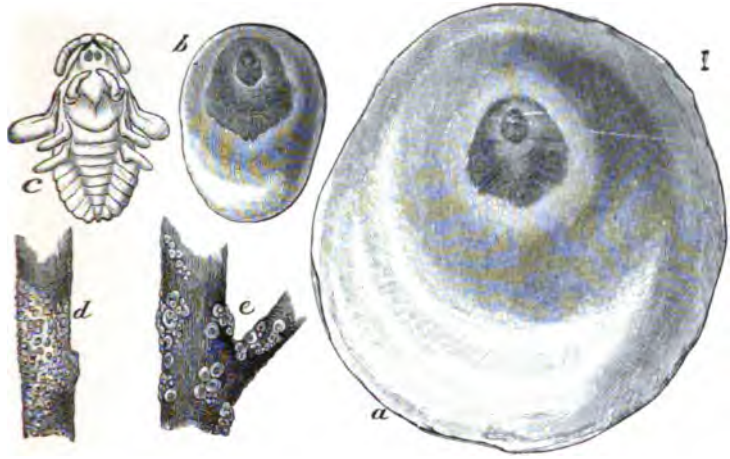

FIG. 7. — *Aspidiotus Juglans-regiæ* (The English Walnut Scale): *a*, female scale; *b*, male scale; *c*, male chrysalis; *d*, male scales on twig; *e*, female scales on twig — *a*, *b*, *c*, enlarged; *d*, *e*, natural size. (*From U.S. Dept. Agric.*)

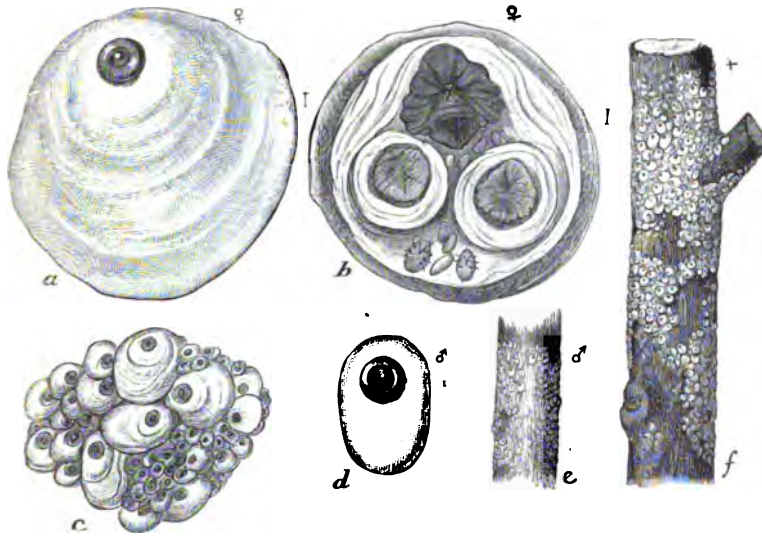

FIG. 8. — *Aspidiotus camelliæ* (The Greedy Scale): *a*, female scale from above; *b*, same from below; *c*, mass of scales as appearing on bark; *d*, male scale; *e*, male scales on twig; *f*, female scales on twig — *e* and *f* natural size; *c*, considerably enlarged; *a*, *b*, *d*, greatly enlarged. (*From U.S. Dept. Agric.*)

Scurfy barklouse (*Chionaspis furfurus*), Fig. 3.
West Indian peach scale (*Diaspis lanatus*), Fig. 4.
Rose and blackberry scale (*Diaspis rosæ*), Fig. 5.
Euonymus scale (*Chionaspis euonymi*), Fig. 6.
Beech and Linden scale (*Prosopophora sp.*).
Willow scale (*Chionaspis salicis*).
Imported oak barklouse (*Asterodiaspis quercicola*).
Cottony maple barklouse (*Pulvinaria innumerabilis*).
Maple leaf scale insect (*Pseudococcus aceris*).
English walnut scale (*Aspidiotus juglans-regiæ*), Fig. 7.
Rapacious scale (*Aspidiotus camelliæ*), Fig. 8.
Common plum Lecanium (*Lecanium prunastri*).

Remedies for Scale Insects. — Experimental work with remedies for scale insects was begun by the Department of Agriculture in 1880, at a time when Professor Comstock made his extensive investigation of the insects of this group. The recommendations which he made at that time practically focussed upon whale-oil soap. In California he found that this substance, applied at the rate of three-quarters of a pound to the gallon of water and at a temperature of one hundred degrees Fahrenheit, killed every individual of the red scale upon orange. Two years later the remarkable work of Mr. H. G. Hubbard upon the scale insects of the orange in Florida resulted in the systematizing of the work with kerosene emulsions, and demonstrated that no better mixtures can be applied to unprotected scale insects than a solution of the standard kerosene soap emulsion in ten parts of water. Mr. Hubbard's results were widely published, and his mixture remained from that time until two years ago the generally accepted and almost solely used remedy against scale insects. No satisfactory experiments with winter washes were made in the East until the winter of 1893–94. California workers had, in the meantime, however, developed a line of washes based in the main on lime, salt, and sulphur, or lime, sulphur, and blue vitriol, or resin, caustic soda, and fish oil. In the winter of 1893–94 extensive experiments were begun at the Department of Agriculture in Washington, and these California washes were naturally tested at the start. It was found, somewhat to our surprise, that although the evidence in favor of their efficacy on the Pacific slope was not to be doubted, in the East they were practically of no use. By no means all of the scales were killed, and in some

instances such an absurdly low proportion of the insects died that this line of experimentation was soon abandoned. The reason for this extraordinary difference in the efficacy of these washes may be laid partly to differences in the average winter temperature between the two sections, and partly to the great difference in precipitation in the early part of the winter.

Following these early experiments, many other substances, in many combinations, were tested, and, not to worry you with details, the practical outcome has been that for dormant trees affected by practically any scale insect, the best wash beyond all doubt was shown to be whale-oil soap in considerable strength. Some species are more susceptible to the action of the wash than are others. Even against the extremely hardy San José scale, one and three-quarters of a pound of the soap to the gallon of water, put on thoroughly, has proved absolutely effective. It is advised that the applications be made in the autumn after the leaves fall, and again in the spring before the buds burst. Little or no harm will be done if the application be made at even a later date, since in April peach trees in full bloom have been treated with no serious consequences. Experiments on a large scale seem to show that the fall application has occasionally an injurious effect in limiting the amount of bloom the following spring, but the increased vigor of the plant probably more than offsets the falling of the bloom.

The greatest difficulty with the soap washes, and one which must be obviated before uniform results can be hoped for, is in the varying strength and character of the soap used. No two brands of soap on the market are alike, and the differing results which are obtained by experimenters are undoubtedly due in large measure to the character of the soap itself, in connection, of course, with the varying climatic conditions. In addition to securing a good strong caustic soap, one is wanted which, at the strength employed on cooling, will not become a semi-solid or glutinous stringy mass, as do most of the ordinary soaps and also many of the fish-oil soaps of more recent manufacture. The old whale- or fish-oil soap employed in the original experiments could be sprayed in solution at three pounds to the gallon, and this is a most necessary characteristic. It is highly desirable, therefore, that soap makers should be encouraged to undertake the manufacture of a definite brand of soap which can be

relied upon to be uniform in composition and strength, and, if possible, to have some authoritative supervision to insure such results.

We have, then, two mixtures upon which we can rely. First, the standard kerosene emulsion, diluted with ten parts of water, for application to the trees while in full foliage in summer and autumn. Second, whale-oil soap at one and three-fourths pounds to the gallon of water, applied in the late fall and early spring to the dormant scales.

Natural Enemies of Scale Insects. — The extraordinary results which followed the introduction of the Australian ladybird (or ladybug as it is more frequently called) into the orange groves of California at a time when their complete destruction was threatened by the white or cottony cushion scale, have attracted an enormous amount of attention to this method of fighting scale insects. As has been repeatedly pointed out in the publications of the Department of Agriculture, this instance was exceptional, and, in fact, practically unique. We had an imported insect to deal with; we had ascertained its original home; we knew that in its original home it was not abundant or destructive, and that therefore it was being kept in check by some specific enemy, since other species of scale insects abounded there and were injurious to vegetation. With no other imported scale insect at the present day do we have these grounds to work from. Nevertheless, this fact is ignored, and persons whose orchards are suffering and who are disinclined to go to the trouble and expense of spraying, are continually agitating the question of parasites and natural enemies. The first Australian ladybird, the Vedalia, as it is called, is being constantly asked for for all sorts of scale insects, and its careless distribution has, in one instance at least, resulted not in a benefit to the section into which it was introduced, but in a great detriment, since, with the predatory insect itself was sent a supply of the fluted scale as food, and when the specimens were liberated the Vedalias died and the scale insect established itself in new territory. A great deal has been said about the merits of the later importations of predaceous insects from Australia to California. Mr. Koebele, the original discoverer of the Vedalia, during an extended trip to New Zealand and Australia, sent to California a number of species of Coccinellids, which were found by him to

feed upon several species of destructive scales. That some of these later importations have multiplied and done good work in restricted localities, there seems little doubt, judging from the emphatic statements of members of the California State Board of Horticulture and their agents and employees. Statements from others as to the inefficacy of the importations are almost equally emphatic, and it is difficult for a person in the East to gain a clear idea as to the present condition of affairs.

The greatest danger in undertaking to use parasites and predaceous insects experimentally on a large scale is that time and money are lost in a dreary waiting for results which may never be achieved. I would, nevertheless, not be understood as condemning careful experiments in this direction, and I am glad to notice that the State Board of Agriculture of New Jersey has endeavored to get an appropriation of a thousand dollars through the Legislature this winter for the purpose of sending Professor Smith, of Rutgers College, to California to collect natural enemies of the San José scale, and introduce them into New Jersey. New Jersey is now the worst sufferer from this insect, and in the absence of a State law compelling insecticide work, and with many fruit growers disinclined to undertake any such work, conditions are very satisfactory for an experiment of this kind. In the beginning of the winter I had made arrangements for a similar introduction of these insects, as well as of a supposed fungus disease which kills the San José scale, into infested orchards in Maryland, and there is a possibility that results of importance may be gained. We have already in the East many insects which feed upon bark lice, and many species of parasites which destroy them. There is no practical way, however, of bringing about any increase in the numbers of any of these species, and their work is, from a practical standpoint, not worth consideration.

The Nursery Question. — The wide distribution of the San José scale in the years following 1887, by Parry Brothers, by J. T. Lovett and his successors, the J. T. Lovett Company; by the Franklin Davis Company, Keene & Foulke, F. Boulon, Parsons & Sons, the Shady Hill Nurseries, J. A. Ramsburg, and the Cherokee Nurseries, has served to draw especial attention to the fact that for many years nurseries have been distributing bark lice and other destructive insects far and wide. In the great

majority of cases this distribution has been made unwittingly. In the case of the San José scale there can be no question of the fact that none of the nurserymen engaged in its spread had the slightest idea that they were sending out such an orchard scourge. Further, it must be said that as soon as the matter was brought to their attention, almost without exception they made every effort to stamp the insect out in their nurseries, and to stop its future distribution. The Parry Brothers, for example, destroyed thousands of young plants, and applied the best available remedies to all their remaining trees. It is certain that as a result of this occurrence, nurserymen in future will examine their stock more closely, and will be far more careful than they have been in the past, so that, after all, the introduction of this insect into the East has not been an unmixed evil. Just as there are careless, in fact criminally careless, persons in all walks of life, so there must be careless nurserymen, and under present conditions fruit growers will not be able to rely upon the absolutely clean condition of any stock which they buy. It has been suggested that every person purchasing nursery stock should demand a guarantee from the seller, — a guarantee which states definitely that the stock has at no time been infested with injurious insects, and that it is in vigorous healthy condition ; and which further agrees, that in case the stock should be found to be infested with scale insects within a certain time from the date of purchase, it shall be replaced with sound stock without cost to the purchaser. Most nurserymen would be ready to furnish such a certificate, but nevertheless this will hardly cover the case. The mere replacing of the stock is a comparatively small matter, but the purchaser will have no redress for the damage done by the introduction of such insects as the San José scale and its spread to his older trees. It is here, as in other aspects of the question, that we must look for legislative aid. The responsibility of the nurseryman should be fixed by law. His responsibility should extend not only to his own stock, but to all stock which he handles in fulfilling his contracts or those of his agents.

That the vast majority of the nurserymen of this country are alive to their own interests in this matter, and that they have either, directly or indirectly, the interests of the fruit-growing population at heart, is thoroughly shown by a resolution passed at the Indianapolis meeting of the American Association of

Nurserymen last summer. Professor Webster, of Ohio, had handled the whole question without gloves; he had shown up the part taken by nurserymen in the distribution of the San José scale in the clearest light; he had commended the frank, wholehearted and straightforward course of the Parry Brothers, and had condemned in the most caustic manner the shiftless, evasive, not to say dishonest, actions of certain other firms. On the conclusion of this paper, Colonel Watrous, of Des Moines, Iowa, rose instantly and said, "I think that a paper that comes out and deals with our interests as fairly and as wisely and intelligently as this one, deserves a vote of thanks; and I move that a vote of thanks of this association be tendered Professor Webster for his paper, and that we approve his course." The motion was seconded and carried unanimously, and the further discussion showed that the members of the American Association of Nurserymen are heartily desirous of working for the best interests of the fruit growers, and are willing to work hand in hand with the official economic entomologists.

Legislation. — The subject of insect legislation has been brought more strongly than ever to the attention of the agriculturist and horticulturist in the East by this outbreak of the San José scale, and in New York, New Jersey, and Virginia steps have been taken in the direction of legislation against this specific insect. More than a year ago, in anticipation of an expected demand for information on the subject of legislation against injurious insects in general, I compiled a bulletin which brought together all the recent laws in the several States of the Union against injurious insects. The demand for this bulletin has been so great from agricultural and horticultural societies interesting themselves in this matter, that the small edition has already become exhausted.

The most progressive State in this direction is California. Her fruit-growing interests are so great and her climate naturally so favorable to the multiplication of injurious insects of many kinds that she naturally takes the lead in this direction. An experience of fifteen years in this work has enabled her horticultural societies to bring about a gradual improvement of the laws and regulations, until the State is at present in excellent condition to control, so far as may be, any outbreak of injurious insects, and in fact to prevent such outbreaks. Briefly summar-

ized, the State laws provide that whenever a petition is presented to the Board of Supervisors of any county signed by twenty-five persons possessing orchards, calling attention to any orchards which are affected with injurious insects, the Board shall within twenty days select three commissioners for the county, to be known as the County Board of Horticultural Commissioners. These commissioners serve three years, and it is their duty, whenever they deem it necessary, to cause an inspection to be made of any orchards, nurseries, fruit-packing houses, or salesrooms, and if they are found infested with injurious insects to notify the owner or person in charge, of the condition of affairs, and require them to eradicate and destroy the pest. If the owner refuses or neglects to abate the nuisance, the commissioners do the work themselves, the expense becoming a county charge, the sums so placed being a lien on the property from which the nuisance has been removed. The commissioners further have power to divide the county into districts and appoint local inspectors.

At the same time the State Board of Horticulture is empowered to make certain regulations covering the State work, and covering the introduction of new injurious insects into the State. Some of these regulations which bear upon quarantine provide for the inspection of all trees, plants, buds, and scions brought into the State. The quarantine officer of the Board must be notified within twenty-four hours of the arrival of such packages, which must be disinfected according to the methods laid down by the Board, upon arrival at any point where they are to be unloaded. If any of them are found to be infested with insects or fungous diseases, they must remain in quarantine fourteen days, or until the quarantine guardian can certify that they are free. Railroads are required to notify the State Board of Horticulture of the arrival of trees or plants from outside the State, postal cards backed with the blank forms being furnished by the Board for this purpose. The United States Customs officers and the Southern Pacific Railway, in particular, render the Board of Horticulture most valuable assistance. It may be interesting to quote in full the instructions of the Southern Pacific Railway Company to its agents. They are as follows:

"Agents are hereby forbidden to deliver any trees, plants, cuttings, grafts, buds, scions, seeds, or pits received from any point

outside the county in which their station is located, until such shipment has been inspected by the official duly appointed for the district in which said station is located. If no county horticultural quarantine has been authorized by the Board of County Supervisors, inspection is not required, unless the shipment originated outside of the State of California, in which case property must be held until inspected by the State Board of Horticulture.

"All agents must keep themselves fully advised of all horticultural ordinances passed, names, districts, and addresses of inspectors appointed by the county in which the station is located, and will coöperate with and follow all instructions of such inspectors, that, by joint effort of the company and the various horticultural Boards, the best interests of the State may be served."

Fruit growers in California thus have the matter of insect pests practically in their own hands, and the work of any county will be practically controlled by twenty-five enlightened fruit growers. The early adoption of any such stringent legislation in Eastern States is doubtful, but there is a growing necessity in every State for a well-framed law which may be put into operation at the outset of any threatened outbreak of an introduced or native species. Absolute safety by means of quarantine is hardly to be accomplished even in California, and in a state so well protected by its geographical situation as Massachusetts, there is by no means the same need for a rigid quarantine. A general law, however, ready to be put into operation might have saved Massachusetts many thousands of dollars in the case of the Gypsy Moth. Such a law in New York would enable efficient work against that almost equally destructive European insect now flourishing in the vicinity of New York City, the Leopard Moth; while such a law in New Jersey would enable the extermination at the present day of the recently imported pear-tree borer — an insect which, if it spreads, will render the growing of pears all through the country a much more difficult and expensive matter than it is at present. The objection to such legislation has always been the fear of possible abuse of opportunities; but the danger in this direction, it seems to me, is not worth considering compared with the danger possible, and even probable, to our horticultural interests in the absence of proper laws.

DISCUSSION.

Mr. Howard illustrated his lecture with stereopticon slides and with specimens of all of the insects considered.

Professor Benjamin M. Watson asked, How can scale insects on small trees best be killed?

Mr. Howard replied that in California fumigation with hydrocyanic gas, under an oiled tent, is most extensively practised. In the East this treatment has not been so successful. Here we must rely mainly upon spraying.

J. W. Manning stated that in good orchards in California the insects are properly treated, but in other places they are as abundant as they are in neglected orchards in the East. He himself had seen orchards in which the Vedalia was not abundant enough to keep down the fluted scale.

William C. Strong moved a vote of thanks to Mr. Howard for his able and comprehensive lecture, which was unanimously passed.

Nathaniel T. Kidder inquired what kind of weather is most desirable for applying remedies.

Mr. Howard replied that it was all important to apply them in dry weather. Some of our best washes, notably the whale-oil soaps, act slowly and do not reach their full effect for several weeks. If there is one season of the year which more than another is apt to be dry for an extended period, that season should be chosen for the application of these washes. The long dry spell in the early winter in California is one reason for the superior action there of the lime, salt, and sulphur wash and the resin wash.

Hon. William R. Sessions inquired about the method of spread of the San José scale.

Mr. Howard stated that its natural spread was extremely slow, the young crawling but a short distance, while at forty-eight hours of age they cannot move. The spread, then, is largely accidental. The active young cling to the feet of birds and to flying insects and are thus carried from tree to tree and from orchard to orchard. The largest spread is accomplished by the commercial transportation of the insect on nursery stock and fruit. A young tree which has been badly infested for two or three years is likely to die. Very badly infested trees should be dug up and burned.

Mr. Strong thought that we need not apprehend a very general increase in scales under conditions of clean culture, such as prevail rather generally in Massachusetts.

Mr. Howard said that this remark of Mr. Strong's was undoubtedly true as regards the old and well-known scales, such as the oyster-shell bark-louse and the scurfy bark-louse, but with certain of the newer species, such as the San José scale and the West Indian peach scale, clean culture will by no means suffice.

Mr. Manning said that the *Gossyparia ulmi* or elm scale has become very common in portions of Massachusetts, and that he had seen it at Madison, N.J. He had worked assiduously to destroy it, but found it a difficult insect to fight. He had destroyed many young and thinks that his trees are now free from them.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 29, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture was delivered on the John Lewis Russell Foundation:

SOME TENDENCIES AND PROBLEMS IN THE EVOLUTION OF SPECIES AMONG PARASITIC FUNGI.

By Professor GEORGE F. ATKINSON, Cornell University, Ithaca, N.Y.

Notwithstanding the great amount of information which we already possess concerning the development and life histories of parasitic fungi, the labor of each year adds more and more to the stock of our knowledge on the subject. There is evidently much more still to be learned before we shall be in the possession of all the facts concerning these fungi which it would be desirable to know from even a practical standpoint. The accumulating evidence of the number of species, the variation in form, the influence of environment, and their peculiar habit or adaptations, suggest that these plants are also affected by the operation of the laws of descent and differentiation, just as other organisms are.

While we can do little more than speculate on the subject at the present time, speculation is often very fruitful in the outcome,

because of the suggestions accompanying it which are often turned to good account. It does not seem out of place, therefore, at this time to point out what seem to me to be some of the tendencies in the evolution of species among parasitic fungi, and at the same time to call attention to some of the more practical problems which may be profitably considered.

TENDENCY TOWARD A WIDE RANGE IN PARASITISM. — One of the very striking tendencies which we see in the case of some of the parasitic fungi is that of a wide range in parasitism, so that the fungus is not confined to certain genera as hosts, nor even to the families in which these genera are located, but the range of their operations and injuries extends beyond these limits. In a sense they are omnivorous, and such species sometimes receive their specific name in recognition of the great versatility of their tastes and depredations, and their easy adaptation to a great variety of things in their gourmand-like search for dainty bits of pabulum.

The common fruit rot is a good example of the fungus appetite which rarely goes begging for some satisfying morsel. It appears to be king of rots in the case of certain of our stone fruits, like the peach, plum, and cherry. But it also attacks the pomaceous fruits, berries, etc., and finds the twigs of the peach, cherry, and other fruits palatable. As with many other parasitic fungi, its growth and the injuries which it causes are alike hastened by the prevalence of wet or moist weather. It is also much more likely to attack overripe fruit, and the fruit grower who takes the precaution to pick his fruit for shipment while it is still firm, or he who selects the hard-fleshed varieties, often checkmates this enemy. The fact that it is more likely to attack the overripe fruit or the soft-fleshed varieties, indicates that it is not strictly an obligate parasite, and that, even when it is doing much of its injury, it perhaps could not be said to be existing as a parasite, since the fruit is then in a very suitable condition to act as an excellent culture medium. It does, however, act as a serious parasite at times, and since it can adapt itself so readily to a saprophytic or parasitic existence, the question might be raised whether or not it is just now in the transitional stage, passing from a saprophytic life to a parasitic one. If this were the case we should expect that as time went on it would become more and more dependent on the host in a living condition, and that

ultimately it would pass entirely from the domain of saprophytism to the domain of parasitism.

Unfortunately we are in the dark as to the true state of things, since we have not the recorded monilia genealogy for more than a few years back. It might, perhaps, be asked with equal propriety, Is not the monilia passing from the parasitic habit to the saprophytic? Here we are also in the dark, but it would seem that what little evidence we have would tend to show that this latter suggestion could not be true of the monilia, since we should expect to find that a fungus which had been an obligate parasite on a very wide range of hosts for a long period would have developed numerous species as the hosts themselves became more and more unlike by the action of the law of evolution and variation among themselves.

If we look upon it as a saprophyte which is making its way into the domain of parasitism, its present habit of growing readily and abundantly during a large part of the season as a saprophyte would tend to prevent its lapse into distinct forms. It would be incorrect, however, not to admit that even in saprophytism the *Monilia fructigena* could exist under conditions which would tend to separate it into distinct species in the lapse of time.

The fungus of potato and tomato rot also possesses quite a wide range in the hosts which give it sustenance. It occurs not only on many of the Solanaceæ, but also on certain members of another family, the Scrophulariaceæ. So far as we know it is much more of an obligate parasite than the monilia, and according to the experiments of a late renowned investigator of the fungi, Anton de Bary, it cannot live as a saprophyte, for when the tissues of the plant have decayed the mycelium of the fungus speedily dies in those parts. Brefeld says, on the contrary, that it grows readily as a weed on various dead substances, but in his works there does not seem to be any evidence to this effect other than the mere statement. Since the eminent de Bary came to opposite conclusions, it would appear more convincing if the experiments leading to these results which Brefeld reached were given in detail.

One year ago I made quite an extended experiment, hoping to be able to grow the *Phytophthora infestans* in pure culture on artificial media, or upon sterilized potato and also on sterilized tomato leaves, which, in the living condition, form the best known

food for the fungus. While I was able to obtain the fungus in pure culture, and kept it growing in the laboratory in this condition for more than eight months, it absolutely and invariably refused to grow when an attempt was made to grow it upon dead, though sterilized, potato and tomato leaves. The growth of the fungus was obtained in the well-known way by cutting open affected potatoes during the month of January, and placing them in a moist chamber with the cut surface uppermost in a warm room until the mycelium in the tubers started to new life and appeared on the surface with the characteristic conidiophores and conidia. Rectangular blocks were then cut from fresh potatoes, rinsed in a one-tenth per cent corrosive sublimate solution, and dropped one each into a culture tube containing water previously sterilized by heat in sufficient quantity to permit of the washing off the corrosive sublimate from the upper end of the block, and to provide sufficient moisture at the bottom of the culture tube. To these blocks of potato, portions of the mycelium and conidia of the Phytophthora were transplanted, and in several of them a pure growth of the fungus was obtained, which was verified by examination with the microscope and found to agree in all respects with the fungus grown on the potato. When these blocks were well covered with the fungus, transfers were made to fresh tomato leaves sterilized by heat, as well as to potato blocks sterilized in the same way. But in all cases the fungus refused to grow on these heat-sterilized substances, though it continued to grow readily when transferred to fresh living blocks of potato.

If the fungus cannot grow as a saprophyte, then it is quite an interesting case of wide range in parasitism, with no apparent tendency to develop fixed forms on the different hosts.

Another member of this genus might be mentioned here, with which you are probably not so familiar, though it has been reported in this country, the seedling rot Phytophthora, *P. cactorum*. This has been known in Europe since 1870, and occurs on quite a wide range of hosts. Because of this de Bary gave it later the name *P. omnivora*, the specific name indicating, as you see, that the fungus is not very choice in the selection of its food. It was first described as producing a rot of species of Cactus, but it is chiefly known as the seedling Phytophthora, since it produces at times a serious rot of seedling trees, especially of the beech. The forms described on somewhat widely

separated hosts would seem to indicate that there was a tendency here to the development of forms which are characteristic on different hosts, though these are not sufficiently distinct morphologically for mycologists now to consider them different species. A vivid imagination might suggest that in times past perhaps the potato fungus was not so very different from the *Phytophthora cactorum*, or, to speak more nearly to the point, that the two were merged in one as a quite widely variable species, but that they now have become quite well separated. If this were the case it might explain the total absence, so far as we know, of the sexual stage in the *Phytophthora infestans*, *i.e.*, the conidial stage might have become so different on certain of the hosts, structurally as to produce a different and characteristic form, and biologically as to hinder it from developing the sexual stage. We must not forget, however, that the absence of the sexual stage might be given a different interpretation, and also that it may even now occur on some hosts which we have not yet examined, or under conditions which we have not yet discovered.

The white rust, *Cystopus candidus*, which attacks many of the species of the Cruciferæ, might also be mentioned as an instance of wide range in parasitism within a single family. The well-known *Puccinia graminis* has a very wide range on the grasses and grains, as compared with many other species of the Uredineæ found on the Gramineæ. Other species might be mentioned, but this number serves well to show how omnivorous some species are in their tendencies as compared with many others.

Tendency toward a Narrow Range in Parasitism. — There is, on the other hand, a tendency with some species to a restricted range in parasitism, so that so far as we know a single species is confined to but few host species, or even to but one host species. This is well illustrated by the common *Fusicladium dendriticum* and *F. pirinum*. The former, the apple scab, is one of the most common of the fungus diseases of the apple tree, especially during wet seasons, affecting the leaves and fruit, and causing dark spots by the growth of the threads and spores on the surface. The *Fusicladium pirinum*, the pear scab, attacks the pear tree in a similar way, and so nearly alike are the two fungi that there has been some question among certain mycolo-

gists whether the two fungi are rightly separated into two species. Cultural experiments will probably settle this question, and there is some evidence of this kind which goes to show that the two are distinct species. This is partly supported by the discovery of what is supposed to be the perfect stages of these fungi, since the form in which we knew them on the apple and pear is what is called the "imperfect," or conidial stage.

Brefeld cultivated a species of *Venturia*, which he called *V. ditricha piri*, and from the ascospores he succeeded in developing a conidial form which bore such a strong resemblance to the *Fusicladium pirinum*, that he considered the *Venturia* to be the perfect or ascosporous stage of the pear scab. Aderhold, in 1894, found another species of *Venturia*, *V. chlorospora mali*, on apple leaves, from which he grew a conidial form very nearly like the *Fusicladium dendriticum* (the apple scab). Then he recounts also how he was able, starting from the fungus of apple scab taken from the leaves of the apple, to grow the conidial stage in artificial media and also to develop the venturia stage, which would be pretty good evidence that the venturia is the perfect stage of the apple scab. We should also expect to find that a venturia is the perfect stage of the pear scab, and this perfect form Aderhold hoped to find in the *Venturia ditricha piri* of Brefeld. But in searching on pear leaves for this species of *Venturia* he found both *Venturia ditricha piri* of the pear, and also *Venturia chlorospora mali* of the apple, and this has prolonged the investigation. But if the apple and pear scab should be found to be one and the same species — and I do not anticipate that this will be the case — still the parasitism would be quite restricted in range as compared with the species above enumerated. It is quite in accordance with the theories of descent that at least in the remote past a single species of Fusicladium combined the characters of the now two species, or at least possessed the inherent tendencies which have resulted in the evolution of these two forms.

Many of the species of the genus *Sclerotinia* exhibit well the tendency to a narrow range in the parasitic habit, as the *Sclerotinia vaccinii* Wor., on *Vaccinium Vitis-Idæa*; *Sclerotinia Oxycocci* Wor., on *Vaccinium Oxycoccus*; *Sclerotinia baccarum* Schroeter, on *Vaccinium myrtillus*; *Sclerotinia megalospora* on *Vaccinium uliginosum*; and others. On the other hand, one

species has quite a wide range, the *Sclerotinia libertinia* F'kl., which we know in this country as frequently producing diseases of forcing-house plants, causing decay of the stems, and then developing small black bodies of fungus tissue called sclerotia.

Tendency toward the Exclusion of Forms from the Life Cycle. — Another peculiarity in the tendency of certain fungi is that of the exclusion, or shutting out of forms, or stages from its life history. A good illustration of one of these fungi is seen in a sterile fungus which I have frequently found to be the cause of damping off of seedling plants, it being often a more common agent in the production of this disease than the *Pythium debaryanum*, which has often been spoken of as the sole cause of this trouble. I speak of it as a sterile fungus because in my experience with it during several years from several different states, I have never been able to find or to produce in artificial cultures any recognized fruiting form. According to peculiarities of its development it would be classed by some under the form genus *Rhizomorpha*, when it develops slender rope-like strands by the parallel interlacing of its threads, or under the form genus *Sclerotium*, when it develops these characteristic bodies.

It is enabled to propagate itself by the breaking up of short moniliform threads on the surface of the sclerotium, the separated segments of two or more cells functioning as conidia, while the sclerotia act as resting bodies to tide the fungus over unfavorable periods for its growth. We cannot say that it has no other form in nature, and probably some form of true fructification is developed at some time, though this is not necessary. As compared with many other forms which quite regularly develop their characteristic fructification, there is a very decided tendency here to the loss of that form if that has not already taken place. The plant at one time undoubtedly had a fruiting form. It may by this time have lost it, or it may have become so changed that in this vegetative condition it practically represents, either biologically or structurally, an entirely different species from its immediate ancestor, and thus has no complemental fruiting form into which it could pass in order to complete its development.

Some rhizomorphs, it is true, have been found to be vegetative states of some member of the mushroom family, the so-called

ozonium, for example, or the rhizomorphs which are connected with the *Agaricus melleus*.

There is no doubt a tendency in a vast number of species to eliminate, or to become permanently separated from, some one-time complemental form. Many of these are represented in the so-called "imperfect fungi," and one or more of our common species of *Botrytis* at least exhibit a tendency in this direction, if they have not already become permanently divorced from the complemental peziza form. One of these, *Botrytis vulgaris*, is especially abundant in forcing houses, attacking nearly all kinds of plants, and growing indifferently as a saprophyte or as a parasite, though perhaps more frequently as the former. It is well known by its conspicuous fuzzy growth on the surface of the affected parts of the plants as it matures its conidia. The mycelium, which is profusely branched and septate, grows in the tissues of the attacked plants, penetrating the cell walls and causing a soft rot of the tissue. From this mycelium the erect conidiophores, or fruiting threads, arise through the epidermis, and at a little distance from the surface produce quite a number of short divergent branches, which bear near the ends oval conidia in such a crowded condition that they appear to form small heads. At first this fuzzy growth is colorless, but with age it becomes grayish-white or grayish-brown in color. Besides the peculiar grappling organs which it develops, and which are said to excrete a ferment that dissolves the cellulose of the host plant at the point of attack, and thus to aid the fungus in gaining an entrance to the tissues, there are developed in artificial cultures, on suitable media, numerous black sclerotia composed of compactly interwoven fungus threads.

I have on repeated occasions seen these develop, especially on sterilized bean stems, or other sterilized plant tissue, in great numbers. Several times an attempt has been made to grow a perfect form from the sclerotia, but always with negative results up to the present time. The sclerotia probably need a period of rest, and this period has been given for several months on different occasions, and when the sclerotia were planted on moist sand they invariably developed the well-known conidiophores of the botrytis form which appear on the diseased plants. Perhaps the period of rest for the sclerotia has not been sufficiently prolonged. I have sclerotia now which are more than one year old,

and the action of these ought to throw some light upon the doubtful history of the fungus. Some have confidently asserted its connection with the *Sclerotinia libertiana*, which also occurs in forcing houses, and we should expect that if it does develop an ascosporous form it would be of the sclerotinia type. But that the connection has been properly established there seems room for doubt, since the sclerotia or the mycelium of the *Sclerotinia libertiana* do not develop the conidiophores, nor have the conidia of this ascosporous form been observed except on the evidence of the doubtful connection of the *Botrytis vulgaris*.

This would seem to show that the botrytis was at least nearly, if not quite, separated from the sclerotinia form. From present conceptions of the descent of the group of the Ascomycetes we must accept the view that the botrytis at one time had such a form, or that it is descended from some other botrytis form possessing a sclerotinia stage, by differentiation in the conidial form only. This it seems to me is a perfectly natural process in the evolution of forms which are restricted for long periods to only one of their phases of development, and it appears probable that it has prevailed to a very great extent in the Hyphomycetes and Sphæropsideæ.

Several of the form genera which produce the diseases of plants known as leaf-blight and leaf-spot, like *Cercospora*, *Septoria*, *Phyllosticta*, *Phoma*, etc., probably contain numbers of species which do not have any complemental perfect or ascosporous form. It is true that in several cases the perfect form has been pretty certainly determined. We might cite as illustrations, the black rot of the grape (*Carlia bidwellii*), strawberry leaf-blight (*Sphærella fragariæ*), leaf-spot of the quince and pear (*Entomosporium maculatum*), cotton leaf-blight (*Cercospora gossypina*), etc.

The perfect stage of the black rot fungus has been rarely found, and then on dead parts of the grape, as the dead berries which lie on the ground during the winter. The phyllosticta form, which attacks the living leaf, stem, and fruit, and becomes a true parasitic form, is very wide spread and common. Quite likely it does not need the perfect form as a means for its perpetuation, since the leaf-spot usually begins earlier in the spring than the development of the ascosporous form, the pycnospores being able to live through the winter, probably in protected

places, as in the crevices of the bark of the vine or in similar crevices on the trellis.

The same is the case with the strawberry leaf-blight, the ramularia stage being the form which produces the disease, while the perfect form, the sphærella, is developed in the dead spots of the leaf, probably late in the season, or during the winter or in the spring. Even here it is not necessary for the continuation of the fungus in the ramularia form, for there are stromata or rudimentary sclerotia developed from the mycelium on the diseased spots, which live through the winter and are able the following spring to develop a crop of the conidia while the sclerotium is lying on the ground. Thus the disease is started anew for the season without the intervention of the sphærella form, and this probably happens in a great majority of cases, since the sphærella stage is rarely collected.

So with the leaf-spot of the pear and quince. The parasitism is brought about by the imperfect form, the entomosporium, which causes small brown spots on the leaves, of a nearly circular outline, with darker minute elevated pustules containing the conidia. These become ruptured in an irregular manner and set free the insect-like conidia. On the fruit it causes irregular blackish spots which check the growth of the fruit tissue at these places and may cause it to crack. The perfect form of the fungus, which Sorauer calls stigmatea, develops on the fallen leaves during the winter and the following spring. But it is not necessary as a means for bridging the fungus over the winter period, even though the ascospores mature early enough in the spring for an infection of the leaves from that source, since the entomosporium spores also live through the winter on the fallen leaves, or are developed in the pustules which have hibernated, and the infection can take place from them as well.

The leaf-blight of cotton has a similar history, the parasitism arising from the imperfect form, or rather the conidial form, being the one which appears on the living leaves, while the sphærella form develops on the dead fallen leaves. Whether the cercospora form of the cotton leaf-blight can live through the winter has not been determined, but it is likely that it can.

Besides a few instances in which the perfect forms are known, there are a very great number of the imperfect forms which have not been connected with a perfect form. It is true that the

number of fungi which we know in the perfect form is very large, even in some of the genera which have been shown to be the perfect stage of some of these imperfect fungi, and also that some of these are even to be connected with others of the imperfect fungi if we could only be fortunate enough to trace out their life history. But many of them are found under conditions which would probably preclude their being connected with any but a few of the known species of the imperfect fungi, unless the phenomenon of heterœcism (growing on different hosts during different stages) has a very much wider application in nature than there has as yet been any hint of from authentic sources. One well-authenticated case of heterœcism outside of the Uredineæ is found in the species of *Sclerotinia*, known as *S. ledi* Nawaschin, which has been found by Woronin and Nawaschin to have its conidial form on *Vaccinium uliginosum*, while the sclerotinia form is developed on *Ledum palustre*.

In many of these imperfect forms there is a sort of physiological dimorphism existing between the parasitic imperfect form, as we have seen, which grows on the living parts of the host, and the perfect form, which we have seen grows on the dead parts of the same host. It appears as a parasite in one case and as a saprophyte in the other. This property of growing as a saprophyte suggests that in some cases the perfect form may grow and produce its fruit on other material than that of the same host on which the imperfect form may develop, since in artificial cultures many of these fungi will grow well on several different substances, which in one sense would be a sort of heterœcism. In other cases it is equally probable that the perfect form, even as a saprophyte, does not depart widely from the path of its host in its development.

One very interesting and important peculiarity lies in the fact that in many of the fungi belonging to the great group which we now have under consideration, each of the complemental forms may develop and multiply quite independently of each other. We have seen how by the intervention of stromatic bodies or sclerotia, or even by the conidia themselves, imperfect forms may live through the winter or during other unfavorable periods for their development and may start the disease and the course of their development entirely independently of the perfect form; or the mycelium may live in the adjacent tissues of the diseased

woody stem, the fungus being in fact perennial in the imperfect form.

A number of the perfect fungi reproduce the ascosporous form during numbers of successive generations without the intervention of a conidial or pycnidial form. In the case of the imperfect forms which are parasitic while the perfect forms are saprophytic, while I have not in mind now any species[1] in which the ascosporous form reproduces itself successively as a saphrophyte without the intervention of the imperfect form, I do not doubt that there are a number of instances of such behavior.

This peculiarity of the imperfect forms developing from year to year quite independently of the perfect form has probably led to a differentiation of the conidial stages of many fungi to an extent which has carried some forms quite beyond the possibility of their ever passing into the perfect form again. By this I mean it is quite possible that following the tendency to vary and produce forms which are regarded as different species, combined with the habit of reproducing their own form from year to year, such physiological as well as structural peculiarities may be evolved as to so change them that they could not develop an ascosporous form without an abrupt reversion or the sudden evolution of a new species of the perfect form.

During this process of differentiation of the imperfect form into a great number of species, the ascosporous form would probably for a time serve as the bond connecting all the forms through which they would now and then pass. But from the quite independent life and development of the imperfect forms some of them would probably become so far changed that the bond would no longer serve to show that they were all of one stock, and we should have species of the imperfect fungi evolved, which become entities in themselves. In such cases we could not hypothetically say that there existed some other stage in which the fungus passed the winter, or some perfect stage which carried it over unfavorable periods, and that the discovery of this perfect form was indispensable to the complete understanding of the relation of the fungus to the particular disease in question and to its etiology.

Such is probably the case in many of the parasitic species belonging to the form genera *Gloeosporium*, and *Colletotrichum*,

[1] Certain species of Teichospora and Ceratertoma do in artificial media.

which cause the diseases known as anthracnoses. While there are probably groups of species included in these form genera, which if they have a perfect form would be found to belong not only to different genera of ascomycetes, but even to different families of fungi, there seem to be species so closely allied that together with the fact that they can in one way or another pass the winter or unfavorable periods for growth, they suggest a like origin from the same perithecial form. The colletotrichum of the bean can live in diseased seed beans and start the disease anew when the seedlings begin to grow. The cotton colletotrichum lives on the seed, either by the vitality of the conidia or from stromatic bodies, so that the disease can be originated at the beginning of the season by simply planting seed which comes from diseased bolls. In the case of the glœosporium of the privet, *G. cingulatum*, the mycelium is perennial in the diseased stems, and breaks out on the advent of spring again. In many of the species stromatic bodies are developed which would assist them in hibernating.

Artificial cultures of certain of the polymorphic fungi belonging to the Pyrenomycetes show that at least under these conditions imperfect forms are usually slow to develop a complemental ascosporous form, though this is by no means general, while the ascosporous form can usually quite readily be grown into the conidial form. Some cultures which I carried on with *Nectria cinnabarina*, a very common fungus found on a great variety of twigs and dead limbs, and by some supposed to be quite a serious parasite at times, illustrate this. The culture was started from the ascospores of the fungus found on dead stems of sambucus (elder). Sown in nutrient agaragar the ascospores germinated, but grew slowly, forming small colonies by the side of large ones of different saprophytic fungi which appeared in the culture. On transplanting some of the colonies to sterilized bean stems in culture tubes, the characteristic stroma and conidia of the tuberculosis stage appeared, but after keeping the cultures for nearly a year and making several transfers, no ascosporous form appeared. I would not infer from this that the perfect form could not be produced from the imperfect form in artificial cultures, for I believe that it could if advantage were taken of the right conditions. But it is a difficulty which has been encountered by others, and in the case of other species, and shows probably in nature also, so far as we can judge from observation, that the

ascosporous form of polymorphic fungi passes more readily into the imperfect form, than the imperfect form passes into the perfect form in many cases.

Tendency toward the Inclusion of Forms in the Life History. — As opposed to the shutting out of forms in the evolution of species there is a tendency among some to the inclusion of forms. This is an accompaniment of the increasing polymorphism of certain fungi, or in the increase of forms in a given species of fungus. By the increase in the number of forms in which a fungus can grow and multiply, it increases its power in the struggle for existence. Some of these additional forms in certain species are probably either developed as a result of the tendency of the same species to cut off an earlier form so that this new form may take its place in tiding it over unfavorable periods for its growth, or in making more certain the perpetuation of the fungus in the imperfect condition. The incipient stromata of many species, as well as the sclerotoid bodies, segments of the mycelium which acquire a thicker wall and a change in the condition of the contents so that the protoplasm is more resistant, gemmæ, and many bodies of these and similar kinds, which in many species take on more or less the form, and certainly the function, of conidia, may be enumerated as coming under this head. A very interesting case is that of the *Monilia fructigena*, which causes the rot of many fruits. Under certain conditions there is developed in this species an aspergillus-like form of fruiting.

Tendency to a Fluctuation in Virulence. — The tendency to a fluctuation in virulence in certain species is a point which would repay careful investigation. This tendency is probably better known in the case of many bacteria than in the fungi. Races of bacteria can quite easily be developed under artificial conditions which are more or less permanent, according to the length of time that they are subjected to the special treatment or conditions. These races may show peculiarities of form, physiological peculiarities, or peculiarities in virility as parasitic germs, and partly upon the attenuation of the virility of certain species does the theory of preventive inoculation rest.

The common botrytis, which has been mentioned above, is an illustration of this tendency in certain species of fungi. Under some conditions it exists in our forcing houses on the dead or

decaying parts of plants, and for a long period produces no serious harm, but again it gains such a foothold at times on certain plants, that nothing short of the destruction of the host will stop its course. For several years I have been interested in watching the habits of this fungus, and many times have been constrained to look upon it as a harmless accompaniment of other disorders; and usually, I think, this is the case. But the present winter some potted roses came under my observation showing at first a few leaves which had been damped off by the fungus. Gradually the mycelium invaded the more permanent tissues of the rose stems until all parts of the plants were so thoroughly infested with the parasite, and so badly disorganized in places, that it is doubtful whether they could ever recover. De Bary has shown how the mycelium of the *Sclerotinia libertiana*, after it has been aroused to activity by growth on the dead parts, is enabled successfully to attack the living ones.

This tendency is of course in many cases largely governed by environment and the physiological condition of the host, but the fungus makes use of these conditions, and for the time is enabled by them to set such a pace of parasitism, that plants are more easily invaded which would otherwise escape injury.

Adaptation to New Conditions. — Close to this tendency to fluctuation in virulence is the tendency toward adaptation to new conditions. This can be easily demonstrated in the case of some species when attempting to grow them in artificial media. For several years I have been attempting at various times to obtain a culture of the leaf-spot of the quince and pear. Several times the fungus has been found to germinate in nutrient agar, but in no case would it develop more than a few short threads in this medium. The spores, after having been transferred to sterilized pear fruit in culture tubes or to sterilized bean stems, showed no signs of growth until after about three weeks, when a minute tuft of mycelium could be observed at the point where the spores had been transplanted. In the course of two or three weeks more numerous spores characteristic of this fungus were present, and the mycelium was quite well developed. In making new transplantings from these spores to fresh sterilized bean stems, a new crop of spores and well-developed stromata were present in a little more than two weeks, and on transplanting the spores from this second crop to fresh culture tubes of the same

medium, the third crop of spores was developed in a little more than one week. Now the fungus grows abundantly and quickly as a saprophyte in artificial cultures.

The nitrifying organism (a bacterium) studied by Frankland presented similar peculiarities in the attempts to grow it in artificial culture media, and there was also a change of form in the adaptation to new culture media.

Other cases might be cited of like adaptations, and they lend some support to the statements that certain fungus parasites of one region when carried to another sometimes acquire a rapidity of development and adaptation to the new conditions on new varieties of hosts, which makes them more virulent than in their native land and condition. It also suggests that certain species of fungi may pass slowly from feral plants to cultivated ones, and when they become adapted to the new conditions may, from the numbers of the host, and perhaps the lack of certain hindrances which existed in the feral state, as well as the more artificial physique of the host, become serious pests.

Fluctuation in Seasonal or Polymorphic Forms. — There is also a fluctuation in seasonal forms, if they may be so called. De Bary notes that *Peronospora alsinearum*, one of the downy mildews, in the neighborhood of Strasburg, in the spring develops conidia which are accompanied or immediately followed by the oöspores on the same host, while in the autumn only the conidia are developed. A fluctuation of this kind, or in the appearance or omission for a greater or lesser period of certain phases of many of the polymorphic species, may account for the varying notions as to what phases or stages appertain to certain species of fungi. Yet it would not do to admit, without careful investigation, the inclusion of forms which have been seen to accompany well-determined stages in the life history. Perhaps it is not yet definitely established just what forms belong to the black knot fungus of the cherry and plum.

Periodicity in Development. — Among other tendencies we may inquire whether there is not a tendency in some species or groups of fungi to a periodicity in the development — a periodicity I mean which would require two or more years in the completion of its round. I do not mean a periodicity which requires several years for the development of the vegetative phase of the parasite before the fruiting occurs, but a periodicity similar to

what occurs in the case of the bearing of some fruit trees, where a tree which has been permitted to bear very heavily one season will usually bear but little fruit the next year, and so a sort of alternation sets in, fruiting years being followed by years of scanty fruit. It has seemed to me at times that the fluctuation which sometimes marks the appearance one year of fungi in great numbers, and then a scanty appearance the next year, might find an explanation in a sort of periodicity. Climatic conditions undoubtedly play a most important part in the periodicity of many of the great fungus attacks, especially of those fungi which are dependent on a new infection of the host from year to year for their propagation. The perennial species of leaf curl and plum pocket sometimes are very abundant one season, and then the next season are comparatively rare. Two years ago the specimens were very plentiful, and the following year I made preparations for a harvest of the species in an early stage of development, but it was almost impossible to obtain any material. It seems strange that climatic conditions should be solely responsible for the great abundance one year and the scanty appearance the following year. Can it be that the mycelium one year largely spends itself in the production of the fruiting form so that there is comparatively little mycelium left in the buds of the tree or young tissue, and that the following year the energy of the fungus is largely devoted to the replenishing or building up again of a stock of the vegetative portion, so that with the opening of the buds the next succeeding year it can advance to the fruiting condition rapidly and abundantly?

Variation in Form. — In many fungi there is a tendency to a great variation in form and habit in what is recognized as a single species. This tendency to variation in form in the case of certain species makes it exceedingly difficult in some other cases to determine just the limits of the species. Certain species of the Uredineæ, as *Puccinia heterospora*, and *P. pruni-spinosa*, vary either in the number of cells in the spore or in the marking of the spore. In the form genus *Cercospora* there is very great variation in the length of the conidia, even in a single species, so that there is some uncertainty at times as to whether this variation is due only to meteorological conditions or to a specific difference in the fungus in question. Again, in the group of fungi known as the powdery mildews, there is the species

Podosphæra oxyacanthæ, quite common on certain cherries and other species of the genus *Prunus*, which has been considered by some to represent several different species, according to the number and position of the appendages of the perithecium. In the genus *Microsphæra* there exists one of the great mycological puzzles as to just what the species *Microsphæra alni* is, so variable and so intergrading are many of the forms which have been considered distinct species by some. Some of these variations in form are concomitant with the occurrence of the fungus on certain host species, and the host species in some cases has served as the only criterion for the separation of forms. Some go so far as to include in this *M. alni* all forms of variation within certain limits on all hosts except the oaks, drawing the line at the genus *Quercus*, while it is impossible from purely morphological characters to separate most of the forms on the oaks from this generalized concept of *Microsphæra alni*.

Tendency toward Fixity of Form. — On the other hand there is a tendency toward a fixity of form and habit in some fungi. Many of the members of the family known as the Smuts, the Ustilagineæ, are, partly from the simplicity of their spores, limited to very slight variation of form. This is well shown in the case of the oat, wheat, barley, and other smuts. Judged simply from morphological characters the variation in form would not seem sufficient to warrant the separation into so many species as are now accepted. Cultures, however, which have brought out differences in the course of development as well as in the confinement to distinct hosts have shown that species are to be maintained where forms were formerly alone accepted. It is quite within reason that at one time several of the species now considered separate were one species, with variations including nearly or quite the limits of the differences exhibited by the species at present, and that now certain of these characteristics have become fixed along with the confinement of the form on a single host.

Physiological or Biological Forms. — Perhaps one of the most interesting tendencies is that in the direction of the evolution of biological or physiological forms of a given species. These are forms which could not be detected from a purely morphological standpoint, but are determined by the study of the relationship of the species to its various hosts.

Some recent experiments in the culture of the Uredineæ by Eriksson, Klebahn, and others, show that some species of rusts which are indistinguishable in form and which have quite a wide range in parasitism, have become separated into biological forms, the forms being confined to a narrow range of hosts in the number of those ascribed to the species as a whole. For example, in *Puccinia graminis*, the common wheat rust, which occurs on the grains and many of the grasses, there are several form species, which are shown to be quite certainly fixed, while there are others which are not so certainly fixed.

In *Puccinia graminis* three forms have been determined which are considered fixed; one form, *secalis*, on what might be called the rye group, since it occurs on *Secale cereale* (rye) and also on *Hordeum pratense*, *Triticum repens*, and *Elymus arenarius*; a second form, *avenæ* on the oat group, *Avena sativa*, *A. elatior*, *Milium effusum*, *Alopecurus pratensis*, and *Dactylis glomerata*; and a third form, *airæ* on a single species of grass, *Aira cæspitosa*. Two other forms which are considered fixed have not been certainly determined. They both occur on certain species of grasses. Still another form occurs on wheat which is not considered fixed.

These forms were determined by cross inoculations with uredospores upon the different hosts, so that uredospores from any member of the rye group would not infect any member of the oat, aira, agrostis, or poa group, but would infect any member of the rye group. Likewise, uredospores from any member of the oat group would not infect any member of the other groups, but would infect any member of the oat group. The wheat form was found not to be fixed, since infection in a few instances took place with uredospores from both the rye and oat group. This fact is looked upon as indicating that the form on wheat is the original one from which all the others have been evolved, and that it retains even at the present time some of its original plasticity.

Another interesting result of these investigations is the fact that the puccinia spores from any of the groups can be used to produce the æcidium, or cluster cup stage, on the barberry, but the æcidiospores from the barberry which were developed from the rye group would not work on the oat group, while they would work on any member of the rye group; similarly æcidio-

spores from the barberry which were developed from the oat group would not work on the rye group, while they would work on any member of the oat group.

Similar form species were found in the case of several other Uredineæ which were investigated, and it would not be surprising if similar specialized forms of species were to be found throughout the entire range of the more strictly obligate parasitic fungi.

PROBLEMS. — These are some of the tendencies which I believe are manifested in a greater or lesser degree in the evolution of species among parasitic fungi. It must be admitted that in many instances we have indulged largely in speculation, but there is, I think, reasonable ground for speculative discussion upon these tendencies. We might regard them as to some extent hypothetical, and thus they would serve to indicate some of the lines on which investigation might profitably be carried further on, for the solution of these questions would throw a great deal of light on the treatment which should be given or recommended for the prevention of the fungous diseases of many of our cultivated plants.

A number of the problems connected with the subject are suggested in the discussion of the various paragraphs, and the solution of these questions requires not only the investigations of the mycologist, but also of the practical fruit grower. Prophylactic treatment, no doubt, must be depended on in a great many cases; but in many others by careful attention to the breeding of healthy, stocky, and resistant varieties of fruits and other plants, to this extent we shall be able to dispense with the knapsack sprayer.

The number of varieties noted for productiveness and for fruiting at opportune seasons is one of the wonderful achievements of the horticulturist and florist. While hardiness is also a characteristic of some of the new productions, it would seem that less attention had been given to this very important quality in planthood than to other points. One of the important problems is the development and fixing of disease-resistant varieties, as well as the general well-being of plant life, and the setting of a wholesome environment to counteract the tendencies among plant enemies which the absence of these qualifications in plant culture is promoting.

One of the encouraging signs of progress in the war upon fungous enemies of plants is the enlightened action by which many horticulturists, as individuals and as organizations, are profiting from the results of scientific investigation. Not only is this so with regard to direct prophylactic treatment, but especially in the general tendency toward improvement in methods of propagation, culture, handling, and environment, which are applied to the management of the fruits that minister so largely to the comfort and happiness of life. These are the coast defences and the methods of diplomacy by means of which threatened invasion is averted, and by means of which the life of our plants and the sources of revenue are preserved.

Discussion.

Before the lecture commenced printed slips were distributed which contained a brief abstract of the paper.

President Appleton complimented the lecturer on the interest and value of his paper, and asked whether any attempts had been made to destroy insects injurious to vegetation by means of parasitical fungi.

Professor Atkinson replied in the affirmative, first saying that the families of such fungi were different from those which attacked plants, and citing the case of the attempt in the West to kill chinch-bugs by means of *Sporotrichum globuliferum.*

Professor A. B. Seymour asked whether the cluster-cups, produced upon the barberry by the specialized forms of *Puccinia graminis,* differed from each other and from those produced by the type, intimating that they might be true species.

Professor Atkinson answered that more investigation was needed before those matters could be determined.

President Appleton inquired in regard to the possibility of cultivating the parasitical fungi which attack insects.

Professor Atkinson replied that these matters are now attracting the attention of investigators. It is claimed that the cultivations of *Sporotrichum globuliferum* which have been sent to the farmers have done great good; but these questions are by no means settled.

BUSINESS MEETING.

SATURDAY, March 7, 1896.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The Secretary being absent by reason of illness, the President appointed Miss Charlotte M. Endicott Secretary *pro tem.*

On motion of Joseph H. Woodford it was voted that on account of its length the report of John G. Barker, as Chairman of the Committee on Gardens, be referred to the Committee on Lectures and Publication without reading.

The following named persons, having been recommended by the Executive Committee, were on ballot duly elected members of the Society:

ROBERT CAMERON, of Cambridge.
VIRGIL C. GILMAN, of Nashua, N.H.
THOMAS HARRISON, of Melrose Highlands.
WILLIAM F. DREER, of Philadelphia, Pa.
J. W. HOFFMAN, Ph.D., of Tuskegee, Ala.
Miss AGNES W. LINCOLN, of Medford.

Adjourned to Saturday, April 4.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 14, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

ORNAMENTAL PLANTING FOR PARKS AND PUBLIC GROUNDS.

By WILLIAM S. EGERTON, Superintendent of Parks, Albany, N.Y.

In response to an invitation extended by the Massachusetts Horticultural Society to read a paper on "Ornamental Planting for Parks and Public Grounds," I have prepared the following brief summary of the "Theory and practice of ornamental planting, as applied to suburban parks and city gardens or greens." It

is impossible to cover so broad a field in a brief paper; my aim has been simply to outline the scheme of work; to suggest the lines upon which natural, pleasing effects can be secured, without entering into an elaboration of detail and technicalities that would expand this paper to unwonted limits, and possibly confuse my hearers.

A number of standard authorities have been drawn upon to facilitate the preparation of this paper, but the subject matter is largely the reflection of an extended experience in landscape gardening and the maintenance of public parks.

The use in America of the word "park" as a general designation for gardens, green courts, and all sorts of public places, is an exaggeration of a French application of the word to the more private or kept grounds of a chateau connected with a forest.

Open spaces for public use in a city may be termed "places;" grounds in turf and trees within places, "place parks;" and broad thoroughfares planted with trees and designed with special reference to recreation as well as for common street traffic, "parkways." A park, as defined by Mr. Frederick Law Olmsted, "Is a place for the enjoyment of rural scenery in a sense that a garden, for instance, is not. A town park is a place of escape to such scenery, from scenery of a town-like or artificial character. The circumstance that distinguishes a park, therefore, is that of seclusion. All parks, properly so called, are surrounded by screening plantations, and it is a leading motive in their design to shut out of view, to those to be benefited by them, whatever might be unfavorable to a continuous impression of consistent sylvan scenery." In a word, to shut off from those within the park a view of such features of a town-like character, as absolutely define the limits of a park and take away the deceptive and pleasing effect of its uncertain area.

The fundamental elements of any large park are not its roads, walks, bridges, buildings, and other accessory features requisite for the public accommodation in the use of the grounds. These may rather be classed as necessary evils. The essential element is the landscape, its surface undulations of hill and dale, or lawn; its trees, shrubs, single or in mass, in grove or copse; its deep woods or open glades, and its broad stretches of greensward or water. All of these elements in their endless combinations are constantly modified by the varying conditions of the point of

view, the atmosphere, and the seasons. The true ideal of park recreation, to persons worn by the harassing turmoil of city life, is the refreshing enjoyment of all that may be seen and felt amid the placid manifestations of nature embodied in the landscape.

There is nothing really different in the general theory of landscape gardening as applied to the ornamentation of parks from that theory as applied to ordinary grounds. The apparent difference lies in the special application to some particular individual undertaking.

In actual practice one park must be treated differently from other parks, this difference of treatment being dictated by the situation, surroundings, and topography. No general plan can be outlined that would suit the demands of every locality. The general idea and keynote, however, to most successful examples of park construction in this country (and there are no better examples abroad) is the simple and natural effects, or meadow-like stretches of lawn, circumscribed or bounded by ornamental plantations properly distributed and massed. The main repose and highest enjoyment of parks reside chiefly in these spots.

The sense of quiet repose ministered to by a large lawn surface is not satisfied by picturesque ground, however vigorously it may be planted, and as the need for quiet repose in this workaday world is more constant than the need for vigorous stimulus, a lack of pastoral, meadow-like stretches of lawn in a large public park will always be felt by the habitual visitor to be a serious disadvantage.

As a general rule each element in the scenery should be simple, natural, and unobtrusive, so that the passing observer is impressed with the manner in which views are successively opened before him, through the innumerable combinations in which the individually modest elements constantly rearrange themselves — views which often possess every quality of complete and impressive landscape compositions.

The aim should be to produce the park, rather than the more elaborate pleasure-ground or garden style of scenery, not only for the reasons above indicated, but because a ground of this character can be consistently and suitably maintained at much less cost; because, also, it will allow the necessary conveniences for the enjoyment of it by large numbers of persons to be introduced in such a way as not to be unpleasantly conspicuous or disastrously

incongruous; and because it favors such a distribution of those who visit it that few shall be seen at a time, and that the ground shall not be overcrowded.

"A landscape in order to be beautiful must have all its parts stamped with a common idea, and contributing to a single sensation. If it gives the lie here to what is said yonder, it destroys itself, and the spectator is in the presence of nothing but a mass of senseless objects."

The north meadow in Central Park, New York, has an area of nineteen acres; this area is greatly exaggerated to the observer by the judicious arrangement of the planting, opening up long lines of sight, and broadening here and there into large expanses of turf. The sheen of the grass, the varied tints of the foliage, the low-lying hillocks crowned with large forest trees, the great bowlders entirely exposed or only half buried, the meadow beyond running back to seemingly unknown distance, — all contribute to make the picture one of pastoral beauty. There is dignity, there is breadth, repose, restfulness, and yet a sense of isolation that is not absolute. It is genuine park scenery that the eye is tempted to linger on and the foot to walk on, and it presents, if reviewed as a single feature, one of the best examples of good park work.

The same general features have characterized the work of a master-hand, in the long meadow of Prospect Park, Brooklyn, and will be secured in Franklin Park, Boston, when completed, and time has matured the growths and mellowed the crudities of the site.

The landscape gardener must take into consideration all the impressive and natural elements of the locality, in the planting of any park of sufficient extent to have a distinctive landscape character. The general aim of his work will be to make a harmonious combination with the dominant characteristics which nature has already stamped upon the site. He will seek a fuller or richer development of the essential leading features, simply softening what is hard, clothing what is bare, filling out what is meagre, and enriching what is beautiful, — all in harmony with the original type.

He will thus avoid all novel conceits, all conspicuous eccentricities, all incongruous intrusions, and be guided by his understanding of the laws of nature and his sympathy with them. It

is a common practice to value the decorative work in planting, on any given site, in general proportion to the degree in which it is obviously artificial, new, or peculiar. Thus clumps of trees and shrubs, or beds of flowers and foliage plants, are located in conspicuous places, without fitting relation to the natural conditions of the landscape.

What is needed, therefore, is popular education with respect to the beauty, adaptability, and arrangement of the component parts of successful design in landscape and gardening work.

There are fully one thousand different species and varieties of ornamental trees and shrubs, besides great numbers of hardy flowering plants, all possessing distinct features of beauty, that will thrive in the greater part of the United States. It is an intimate acquaintance with the habit, growth, and ultimate development of the greater part of these that insures to the landscape gardener success in selecting, planting, and grouping the varied specimens, so as to combine all the essential elements, in form, foliage, and color, of a pleasing landscape. The lack of such an acquaintance with the varied characteristics of planting material is one of the most fruitful sources of failure in planting our parks and public grounds.

In employing trees and shrubs for ornamental planting, such a selection and arrangement should be made as will, for the number used, insure the greatest possible degree of beauty and interest attainable.

In a study of natural landscapes, it may be observed that trees, shrubs, and plants bear relation to each other:

First, in the form of groups and thickets, or dense woods.

Second, in open or somewhat scattered arrangements.

Third, as single, isolated specimens.

Fourth, as being wholly absent in places.

The partly open feature of a landscape is most essential, if we would have beautiful parks or public grounds. This treatment affords an opportunity for viewing the grounds at varied points; for admitting cool breezes and sunshine; for the effects of light and shadow; and, most important of all, that degree of general repose and breadth, without which no park or public ground of any extent can be altogether satisfactory. The prevailing idea in planting would seem to suggest the bringing together such specimens of trees or shrubs as possess contrasting qualities;

arranging these group against group, with a slight scattering of individual specimens here and there, but all done for making the distinguishing and often strongly marked characteristics of one kind relieve and offset those of others, without, however, too great contrasts in color.

Often a single native tree, with ample space for complete development, will, by its form and color, accentuate and bring out the contrasting features of other neighboring growths, as single specimens of our native oaks, maples, ashes, and dogwoods emphasize and bring into bold relief the sometimes sombre tints of our native woods, and brighten the whole landscape in autumn by a bold dash of glowing color. It is, however, an intelligent use of this material that betokens the skillful and successful gardener.

In the matter of general style and location of groups, it is obvious that as a rule the masses must, in all small areas, be planted along the outlying portions of the turf places, keeping the centres open. Such arrangements correspond in principle with nature's most effective groupings.

The most delightful natural landscapes show open vistas, skirted by margins of woody growth, either near or distant, which limit and support the former. A special merit of this system of planting is, that it tends to give an enlarged idea of the size of the grounds so treated. Grounds with the boundary shut off by masses of planting, and these masses arranged with irregular outlines, will look larger than they would if the boundary line were plainly in sight.

The value of a park depends mainly on the disposition and quality of its woods and planting, and on the relation of these to other natural features within its limits.

The older the wood, and the less newness and rawness there is to be seen in all the elements of a park, the better it serves its purpose. All schemes of planting are based upon orderly, seasonable adjustment, involving careful observation of the growth and development of the varied material that composes the plantations from year to year, the selection and retention of the choicest and more vigorous plants, and the removal from time to time of material planted for temporary purposes.

For this reason a permanency of employment as regards the superintendent or care-taker, if he is fully qualified to perform

the varied duties of his position, is desirable. A new broom is apt to sweep away or try to improve upon the work of the old, and may in a day almost destroy the result of careful study and years of development.

The appointment of the executive head, and the skilled gardener, should not be dictated, as is too often the case, by political motives, but by skill, qualification, and entire fitness for the responsible duties of the position.

A change of administration means usually a change in the entire policy of the preceding one. Thus plantations suffer for lack of attention and timely thinning, or open vistas are made where plantations have been massed to hide objectionable features.

The following extract, clipped from a New York paper soon after the appointment of Mr. Samuel Parsons as Superintendent of Central Park, will illustrate this principle, the new broom, in this case, being an intelligent medium of reform in the maladministration of the old one.

The same defects have been noticeable in Prospect Park, Brooklyn, from a like cause, and are being gradually remedied.

The article is entitled:

"RENEWING CENTRAL PARK.

DEFECTIVE MANAGEMENT OF THE TREES AND SHRUBBERY TO BE REMEDIED.

"The necessity of a comprehensive renewal of the plantations of Central Park is insisted upon by Superintendent of Parks Samuel Parsons, who states that a loss of shapeliness, vigor, and, in many instances, of life, has deprived them of many of their ornaments and marred the original artistic effect of the designer. This has largely resulted from stress of weather, but defective management of the original system of planting has been mainly to blame.

"The intention of the designers of these plantations was to create large masses and comparatively immediate effects, in pursuance of which trees and shrubs were set out at short distances apart, the intention being to remove from time to time such plants as showed signs of becoming crowded. The work of thinning has not been persevered in, and all over the park trees and shrubs may be seen whose shapeliness and proper development have been prevented by overcrowding, while in some parts

the plantations have suffered so from this cause that their removal and renewal is the only remedy. Where the process of thinning can still be pursued to advantage it will be necessary in doing the work to bear in mind the original intention of the designer, so as to find out the particular mass effects of sky lines, middle distance, and foreground that were aimed at, and also to comprehend the shadings of color that were intended to be produced. In order to accomplish this the missing links of color and form must be supplied in the shape of fresh trees and shrubs, and this must be done without injuring too radically the existing general effects of the park.

"The selection of trees and shrubs for the new plantations is another difficulty which presents itself in connection with the proposed renewal. During the park's existence of thirty years it has become apparent that many of those planted have proved unsuited to its soil and exposure. Among these are the Norway and other spruces, the pines, with the exception of the white, the mugho, the Cembra, Japanese evergreens, known as the retinosporas, and, among deciduous trees and shrubs, the European ash, poplar, alder, elm, and oak. On this account a careful revision of the original list of trees must be made, with the aim to use in large quantities such trees and shrubs as have come into use since the plantations were made. The work involved in the renewal will have to be done gradually, so as not to seriously mar the park's general effect, and a system will have to be established of removing only comparatively small portions of groups in different parts of the park, new mold and fertilizer being applied wherever the operation is carried on.

"For the new trees a draft will have to be made upon foreign and domestic nurseries, and the park nursery will have to be kept well supplied with young trees in the future, so that the work of transplanting can be readily accomplished at the most suitable season. An enlargement of the force employed in the park will be necessary in order to accomplish the work, and the suggestion is made that one hundred gardeners be employed in addition to the force of twenty-five or thirty now engaged, with the necessary assistant laborers, which done, the work may be greatly advanced during the coming year. An estimate of the cost of the proposed renewal is not possible, because the exact condition of thousands of trees and shrubs and the cost of handling each of them can

only be determined when the work is systematically undertaken."

The value of public gardens, places, or greens, in distinction from parks, is dependent less on the extent of their sylvan elements than on the degree of convenience with which they may be used; those being the most valuable, other things being equal, through which the greatest number of people may be induced to pass while following their ordinary occupations, and without serious hindrance or inconvenience. Therefore, if a piece of ground of one or more acres in the midst of a busy town is laid out and managed with a view to providing upon it the greatest practical degree of plant beauty in trees, shrubs, flowers, and turf, on the same general principles that a private garden for the same purpose would be, it will be of comparatively little use; for the walks will be indirect, the low planting of the outer parts will obscure the general view of passers-by, and there will be frequent crowding, jostling, and disturbance of quiet.

Neatness and the maintenance of orderly conduct among visitors in such a ground becomes also exceedingly difficult. It is much better to plant and decorate them in such a manner as will not destroy their openness or cause inconvenience to those who have occasion to cross them. For this purpose their plans should be simple and generally formal in style, their passages should be broad and direct, and they should be provided with seats in recesses (preferably) or on the borders of the broader paved or gravelled spaces, leaving ample room for free movements. The green effects of the grass, accentuated by the shadow effects of trees, properly selected and grouped, should be made the chief and most important feature of their treatment. The trees should be high stemmed and umbrageous, and flowers and delicate plants little used except in vases or as fringes of architectural objects. Union square, New York City, is a good example of this style of treatment.

Architectural adornments may properly be employed in small parks, so long as they do not seriously interfere with the open grass effect. There may be even busts or statues (if artistic in design), but especially suitable are drinking fountains, and fountain basins, with great sprays of water. The fountain basins may be effectively ornamented with lotuses, water lilies, and other decorative water plants. All such adornment of small city squares

or greens tends to appropriately enliven and enrich the general appearance of a crowded city, where the effect of everything is artificial, and more or less formal or tedious.

In the city, the surrounding conditions are not primarily favorable for the growth of plants. The air is apt to be hot, dry, and dust-laden, if not actually impure. Consequently the soil should be thoroughly enriched, and the most vigorous and hardy trees and shrubs employed. Evergreens seldom do well in large crowded cities. It is better to plant certain hardy, deciduous trees and shrubs, such as the Privet, Weigela, Snowball, *Spiræa opulifolia*, American Thorn, Philadelphus, Honey-Locust, American Linden, Norway and Sugar Maples, and the Oriental Plane trees, than to meet with failure by the introduction of other less hardy material.

The Persian rug in flowers or foliage plants is an admirable thing properly placed, but then it is not always in harmony with the natural effects suitable to a special surface of greensward. Carpet or ribbon gardening, artistically composed, is both right and proper in its way, only it should be subordinated to, as well as coördinated with, other compositions of color throughout the entire system of planting on any special lawn. Color for almost every one is a great and positive delight. This delight may be more sensuous and less purely intellectual than that inspired by agreeable form, but it belongs more truly, nevertheless, to the restful physical pleasure associated with the lawn. If gardeners were all artists, we should have fewer examples of incongruity in both form and color.

A knowledge of plants, and the possession of an adequate supply, does not always insure a satisfactory grouping and massing of them. There is needed an artistic sense of form and color effects that, if not inborn, comes only with observation, reading, and an innate love of the beautiful. A successful propagator will not necessarily be a good lawn decorator. In addition to this special fitness, there must be a general plan, carefully studied as to its application to the locality and surroundings to be treated. A ground plan should be made, drawn to a scale, of the locality to be embellished, and the beds or groupings located and carefully studied as to perspective and outline. The plants should be selected with reference to height, form, and color for each individual bed, simply considered as a part of the general

scheme for the whole plan of decorative work. In this way only can a complete and satisfactory result be secured. The flower garden treated in any other way is simply an aggregation of detached effects that have no reference to a complete design.

It would be impossible for me in this paper to specify in detail just what trees, shrubs, or plants are to be used, and what general plan of arrangement should be followed, to arrive at satisfactory results in every case. The whole matter is a question of taste, experience, and the faculty of adapting the design to the especial locality to be treated. One might as well attempt to make a general plan for a park and apply it to every park to be improved.

In the latter case the landscape architect or gardener secures primarily a detailed topographical survey showing the inequalities of the surface and all objects covering it. He makes a careful study of the surroundings, and the general topographical features to be included in the territory to be improved. The general scheme of his work will be largely dictated by the existing conditions and the environment.

The same careful study should be made by the gardener for any plan of ornamental planting, either of trees and shrubs or of purely sub-tropical and floral decoration.

To have on hand a certain number of decorative plants and to place them properly and expeditiously, with due regard to their immediate environment, requires more than the usual ability of the average gardener.

It is to be hoped that the "Theory and Practice of Landscape Gardening," now the subject of special study at the St. Louis Botanical Gardens and the Bussey Institution, will produce a class of gardeners well fitted to harmonize the general scheme of park ornamentation; to emphasize, in the larger parks of sylvan character, the natural beauties of the localities to be treated, by a judicious admixture of the ornamental features of planting; confining the floral work, if any, to the immediate vicinity of the refectories, terraces, fountains, conservatories, and other architectural embellishments, and reserving the main features of the park for woods, lawns, water effects, and natural scenery.

In the smaller city parks or places such a gardener would construct as direct and broad lines of transit as would be consistent with easy and graceful lines; he would secure ample lawns and

umbrageous trees; he would mass the shrubberies, if used, in groups of a kind for effects of color in flower and foliage; and, if flowers are used, he would harmonize these, by the introduction of sub-tropical or foliage effects, with the other features of the park, without too glaring a transition from the natural to the artificial form of embellishment. To do all this involves a careful study of the growth and habits of plants, the proper composition of soils to produce the best results, a knowledge of form and color to properly group and blend the many combinations of leaf and flower that modern introductions have made available, so as to combine effects that will be in harmony, and present a picture that will heighten, and not mar, the main features of the garden.

In Washington Park, Albany, N.Y., there are no obtrusive constructions, no bizarre effects in floral design or color, no glaring tones in the foliage, but the general impression made upon the visitor is that of a restful, pleasing landscape, well kept and tastefully arranged; and yet there is a very generous use of flowers and bedding and sub-tropical plants, supplemented by special exhibits of foliage and bench plants in July and August, and chrysanthemums in October and November. In addition to this are shrubbery borders, enlivened with selected perennials, and these are sometimes massed for especial effect of color. Mixed borders have been made in connection with a screen of flowering shrubs as a background (one of the most effective methods of using perennials), the foreground being shaded down to the bordering walk by perennials, arranged somewhat as to height.

Where detached masses of color are desired, this effect is secured by massing Larkspurs, Hollyhocks, Sunflowers, tall Phloxes, Lilies (candidum and auratum), and Pyrethrums, in solid blocks, each variety in a bed or bay by itself, thus securing color effects long after the shrubberies have ceased to bloom.

In these borders, and generally throughout the park, the plants or groups are properly named, thus affording the public an opportunity of becoming acquainted with the many varieties of plants used. The following is an extract from my report of the current year to the Board of Commissioners of Washington Park, Albany, N.Y.:

"The floral exhibits from early spring to the middle of November, both in the open borders and during the midsummer and fall exhibits in the Lake House, have afforded the public an opportunity of seeing a large range of decorative plants, with a number of recent introductions of merit. The June display of hardy roses was worthy of especial mention, covering a range of one hundred or more varieties, and embracing more than two thousand specimens. The exhibition of border plants, supplemented by special exhibits of specimen palms of many varieties, agaves, and tender stove plants, utilized in some localities especially adapted for their display, makes the exhibit in Washington Park somewhat exceptional in character, and particularly attractive to plant lovers."

"The midsummer exhibit of caladiums and other foliage plants was largely attended. This exhibit gave striking proof of the fact that the love of color and form in foliage is as attractive to many as flowers."

I add also the following from the "Country Gentleman:"

"The third annual exhibition of chrysanthemums grown in the Washington Park greenhouses was held in the Lake House, November fourth to eighth, and marked a steady advance. Just how many plants were shown it would be hard to say, additions being made from time to time as new blooms developed; but there were over two hundred varieties, against one hundred and forty last year and eighty the year before. There were three collections — the main one being "selections from stock of leading growers;" the smaller ones, "Washington Park seedlings" and "Japanese Seedlings." These two are of special interest, both as to form and color. One of the most vigorous of the Park seedlings — seed sown last January — has been trained on a fan-shaped trellis, and bore over four hundred white blooms! In richness of color, delicacy and variety of form and tint of petal, the Japanese seedlings were preëminent. They formed a complete flower garden in themselves, an effect never produced before, we think, by any single flower except the chrysanthemum."

The term "sub-tropical" is popularly given to flower gardens embellished by plants having large and handsome leaves, noble habit, or graceful outlines. It simply means the introduction of a rich and varied vegetation, chiefly distinguished by beauty of

form, to the ordinarily flat and monotonous surface of the garden. This system has taught us the value of grace and verdure amid masses of low, brilliant, and unrelieved flowers, or rather, has reminded us how far we have diverged from nature's ways of displaying the beauty of vegetation. Sub-tropical gardening has taught us that one of the greatest mistakes ever made in the flower garden was the adoption of a few varieties of plants for culture on a vast scale, to the exclusion of interest and variety, and too often of beauty and taste.

The ability to make a good selection of the most beautiful and useful from the great mass of plants known, is the gardener's pride, and in no branch must he exercise it more thoroughly than in this. Some of the plants used are indispensable — the different kinds of Ricinus, Cannas in great variety, Colocasias, Palms, many fine kinds of Dracænas, Yuccas, Agaves, Cycads, Pampas grass, Arundos, Rheums, Acanthuses, Wigandias, *Rhus glabra laciniata, Aralia Japonica;* — all of these, and more, are used to good advantage.

Where such plants are not available, by a judicious selection from the vast number of hardy perennial plants now grown in this country, and by associating with these flowering shrubs selected for special grace, height, and beauty of outline, a permanent garden can be secured that will, with but little care, outrival in beauty any attempt at formal bedding upon the old lines of carpet work, and never cease to be a "thing of beauty and a joy forever."

The true motive is for a restful, quiet arrangement of border planting and grouping, for harmony in color, and not for glaring, striking effects. Much of this effect is secured by the aid of foliage plants, and not with flowers.

There are two localities set apart for floral exhibits in the open borders in Washington Park, where the design of the grounds is somewhat formal, and at no other points are flowers used. The interior of the park is treated in a simple manner, the main feature of the tree growth being the size and beauty of the elms. A large number of ornamental trees and shrubs have been introduced, but they are so distributed as not to become prominent features of the landscape, the shrubs being confined to borders for screens, or massed for color effects, or treated as specimens, with ample space for individual growth and expression.

A portion of the lake in Washington Park has been set apart for the display of hardy and tender aquatic plants. The hardy varieties are planted permanently in beds depressed about two feet below the water surface. The tender varieties are removed in the fall and remain dormant, generally as bulbs, in the greenhouses, until the water is warm enough to put them in the lake the following summer, the bulbs being forced into active growth early in the spring. There is no feature in the park that has given such universal satisfaction as this aquatic plant display, and none that with ordinary care will more fully recompense the gardener.

The lake margins are treated naturally, having no stone or artificial encircling wall. The banks are well shaded, and provision is made at frequent intervals to reach the water by circuit walks and expansive beaches. The lake margins immediately surrounding the aquatic garden are planted with water-loving plants, and back of these is selected shrubbery, so that the transition from the aquatic garden to the outlying features of the park is gradual and not discordant.

The design of this paper has been, in a measure, to moderate or curb the tendency to too generous a use of flowers, arranged in geometric or formal designs, either in urban or suburban parks, and the concentration of such effects, when used, in localities especially adapted and heretofore suggested for such displays; blending such exhibits with their immediate environment, by shading down the color tones, so that, to the observer, the transition may be gradual, from the natural to the artificial, or *vice versa*, without too sudden a change in form or color; and, furthermore, I recommend the use of fewer flowers and more foliage plants. Scattered, detached effects are to be avoided. Treat the garden as one composition, each bed or group of plants being a necessary and integral part of the whole picture. Either mass for color effects in foliage or flower, or select for grouping, such shrubs as are noted for individual form and expression, giving ample room for development, and space to view them from all sides. Rely mainly upon the lawn, and natural effects of trees and shrub planting, for the impression to be made, and subordinate the artificial to the natural.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 21, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

GRASSES.

By Professor F. LAMSON-SCRIBNER, B.S., Chief of Division of Agrostology, United States Department of Agriculture, Washington, D.C.

Coming to Boston to address you on the subject of grasses, is like carrying coals to Newcastle, for is not this the home of the widely known and justly celebrated author of Flint's "Grasses and Forage Plants"? But the subject is a broad one — as broad as the world is wide, and as varied as it is broad; so broad, and embracing so many diverse lines of investigation, all alike interesting, that I have found it exceedingly difficult to determine what subjects to take up, or where to draw my limitations. Good things will stand repeating, and in a multitude of counsellors there is safety. New ideas are rare indeed, but in the application of old ones may spring a happy thought of use to some one, and there always exists this possibility to encourage the speaker.

"The grass faileth; there is no green thing," is an apt expression of the extremity of desolation. Where there is no grass, there are the absolute deserts. Where our best grasses abound, and where they receive the most attention, there we find our highest civilization and greatest prosperity. Destroy the rich verdure of our pastures and meadows, and how much of the pleasure as well as the profit of the farmer's life would be blasted. Destroy the little grass plat of the contracted yard of the citizen, and how much would the enjoyment of domestic life be narrowed.

Grasses may be considered the plebeians among the families of the vegetable kingdom. They are ubiquitous, and in all temperate regions innumerable. In their number of species they constitute one-fourth of the flowering plants of the arctic zone, one-twelfth of those of the temperate region, and from one-twelfth to one twenty-fifth of those of the tropics. In the countless myriads of individuals, particularly in the temperate zone, grasses far surpass all other orders of plants. They form the rank and file of the army of plants; but here, as in armies of

men, it is the rank and file that does the real service. There are, however, lordly members among the grass family, for some of the tropical species vie with the tallest trees in height. The immense bamboo forests of India are forests of grasses, and to the dwellers of those regions they are as useful as are our own forests to us. They furnish material for the construction of their houses and household furniture and domestic utensils, articles of ornament, and sometimes even articles of clothing. Some of the bamboos furnish drink to the thirsty traveler; others occasionally supply food; and several times within historical periods have the fruits of these bamboos saved hundreds of thousands, if not millions, of people from actual starvation. So generally useful are the bamboos that their products have entered into the commerce of the world.

A mere enumeration of the diverse uses of grasses would more than occupy the time which has been allotted to me here; but at the risk of wearying you, I must briefly outline the more important of these. Grains, the product of the cereal grasses, form the staple food of more than four-fifths of the human race. Wheat is a grass, and the world's production of wheat is estimated at two billions four hundred millions of bushels. Rice is a grass, and the production of this cereal in the East exceeds one million tons, and feeds one-third of mankind. Indian corn, that king of grasses and peculiar product of America, is one of our greatest sources of income. Its cultivation now extends over ninety degrees of latitude and has been carried to all parts of the world. Oats, the most nutritious of all grain foods, barley, and rye are members of the grass family; and aside from these grains, there are a number of grasses which furnish human food, particularly to the natives of Southern Asia and the wild tribes of Africa, the value of whose product cannot be estimated. In addition to the direct usefulness of these grain-bearing grasses to man, several are used very largely to supplement the forage of our domestic animals. They have a further use also, in the production of alcoholic drinks. Nearly half of our sugar supply is derived from grasses. The world's production of cane sugar is about three million tons. What is said here of the products of the cereal-grasses indicates only in a slight degree the great usefulness to man of a very few members of the grass family. A larger number are scarcely less useful, although indirectly.

These are the grasses of our meadows and pastures, which furnish us our beef and mutton, our butter and milk; which feed our horses, the noblest of our domestic animals, and still among the most useful, in spite of electric railroads, horseless carriages, and bicycles. The money value of the hay crop of the United States for the year 1894 was estimated at nearly half a billion dollars, and the value of the grasses in pastures of the Northern States may be considered equal in value to the hay produced, while in the Southern States and the great grazing regions of the West, the value of the pasturage far exceeds that of the hay crop. A conservative estimate, therefore, of the annual value of the grasses of the meadows and pastures of this country alone exceeds a billion dollars.

"Before dismissing this subject of the utility of grasses in furnishing food for man and the animals he has domesticated, we shall do well to pause for a little reflection upon its relation to the industry, commerce, and wealth of nations, as well as to man's subsistence — our dependence not only upon the cereal grasses for our staple vegetable food, but indirectly upon the forage grasses for our supplies of animal food, namely beef, mutton, venison, and dairy produce, as well as for various animal substances such as wool and hair, hides and skins, bone and horn, oil and tallow, used for textile and other manufactures (notably woolen fabrics and leather), or for domestic purposes — the large proportion of the world's inhabitants engaged in agricultural (chiefly cereal cultivation) and pastoral pursuits, in some countries from seventy to ninety per cent of the adult male population — the vast internal and foreign trade connected with the distribution of agricultural products by land and sea — the numerous and important industries concerned in operating upon one or other form of this produce in order to prepare it for consumption; and lastly, the enormous capital employed in all these industrial activities, and the consequent accumulation of wealth. It is only when we take a comprehensive survey, such as here indicated, that we are able to form some conception of the transcendent importance of the Gramineæ." [1]

There are a number of minor uses to which many species of grasses have been applied; probably the most important is the material they furnish for paper-making. Several of our native

[1] William Hutchinson in "Handbook of Grasses," 1895.

species furnish a good fibre for this purpose, but the grass which has been used most largely in the manufacture of paper is the Esparto grass of the Mediterranean region. The quantity of this grass annually imported into England at present amounts to over two hundred thousand tons, valued at three-quarters of a million pounds sterling. Some grasses are used in the manufacture of cordage, or hats, or of matting; others make thatch; some are employed in medicine; others yield perfumery. Among the natural uses of grasses may be mentioned that of binding drifting sands and the protection of our coasts and river banks from the action of the tides or floods, and their use in protecting the soils of our fields and meadows by the covering which their turf affords. They extract from the earth and the air elements which they transform into substances that serve as food, and in doing this they help to purify the air we breathe.

Contrary to the general idea, there exists among grasses a remarkable diversity of form. So varied is this that botanists have already defined nearly four thousand distinct species. This diversity appears throughout all the organs of the grass. In some the roots are simply fibrous, and the plants grow in tufts or bunches, as Sheep's Fescue and Orchard grass; others have what we call creeping roots, and it is among these that we should look for the best turf-forming species. Some have stems less than an inch in height and appear like mosses covering the soil and rocks; others attain the height of our tallest forest trees. Some have leaves as fine as the finest thread; in others the leaves are those of the ideal blade of grass, while others again have leaves like those of palms, or leaves as short and as broad and as round as those of the well-known smilax. To explain the details and the varieties existing among the flowers of grasses would be wearisome. That grasses have flowers is an idea rarely entertained by any except botanists, and I have frequently heard the remark, "I did not know that grasses had flowers." They do, however, although their special characters may differ from those of other plants; and provision exists here, as it does throughout nearly all the tribes of vegetation which bear flowers, for securing cross-fertilization. The flowers of grasses are inconspicuous and secrete no nectar. They are not, therefore, attractive to insects, which play so important a part in the process of cross-fertilization. The pollen of grass flowers is

dry, light, and powdery, and easily blown about by the wind, and cross-fertilization among grasses is effected by this agency.

If the variety in the external form of grasses is wonderfully great, their internal structure is scarcely less so, and the histological studies of grass stems, leaves, and fruits are exceedingly interesting. Intricate problems in mechanics are exhibited in the structure of the slender cylinders which constitute the grass stem, and which, in many cases, possess a strength most surprising. The amount of mechanical tissue entering into the structure of the stem which holds a heavy head of wheat is insignificant, but the disposition of the various elements of this tissue gives it the strength necessary to perform its proper functions. Again, the leaves of grasses, which many think so much alike that they would consider the expression "as like as two blades of grass" as forcible as the more common phrase "as like as two peas," exhibit a diverse and marvelous interior structure. No more delicate tracings or beautiful designs of lace work can be imagined than are presented by these same grass leaves when viewed under the microscope. The designer might well study these tissues, for in them he would find many new figures and combinations of lines, the beauty of which he could not hope to excel, and the reproduction of which could not fail to receive the highest admiration. In their internal structure as in their outward contour, the leaves of grasses present such definite characters that these may be used to distinguish species. A minute transverse section of the leaf of Kentucky Blue grass, which one could barely see with the naked eye, would, under the microscope, present characters which at once distinguish it from all other grasses. They are totally different from those exhibited by a leaf of Orchard grass, and these again are wholly unlike those of Meadow Fescue. There are certain cells in the leaf tissue, running from the base to the summit, which are larger and have thinner walls than the surrounding cells. These special cells readily absorb or give up moisture, and because of this property they exercise the mechanical function exhibited in the expansion or opening out of the leaves, or their contraction and rolling together.

The provisions which nature has made for the distribution of grasses is an interesting subject, and one worthy of passing notice. In many cases the seeds are covered with delicate chaff-like scales, or are furnished with winged or feathery appendages,

enabling them to be widely distributed by the winds. Others are provided with hooks or barbed spines, by means of which they become attached to clothing or to the wool or hair of animals, and are thus carried about from place to place. Others are so constructed that they will float upon the water, and may be carried long distances by rivers and streams or tides. Others again have firm protective coatings, so that they may pass uninjured through the stomachs of birds or animals feeding upon them, and are disseminated in this way. These are among the natural means of distribution. The manner in which grasses have been distributed through the agency of civilization and commerce is no less varied.

The diversity of form presented by grasses is accompanied by an almost equal diversity in their station, or place of growth. Some are limited to the Arctic regions, others are found only in the tropics; some grow in the sand along seacoasts, others again are confined to the highest mountain-tops near the limits of perpetual snow; some flourish only in moist meadows, others exist in the most arid deserts; some grow in the shadows of forests, others thrive only upon open plains; some are confined to soils heavily charged with lime, others make vigorous growth where practically no lime exists. And it is with all these varied peculiarities which grasses present, that the student of these plants must become familiar, in order intelligently to direct his efforts to improve the forage and grazing resources of the country, the prime feature of interest that the farmer has in this subject.

We will now limit our remarks to the consideration of the economic grasses of this State. It is hard to say which is the most important of these. But if one pays a visit to Cape Cod, as it was my good fortune to do last summer, he will certainly be struck with the great importance of Beach grass, and the special value which it possesses for binding the drifting sands of the coast. Beach grass extends along the sandy shores of the coast just above the reach of the higher tides, from Maine to Virginia; but nowhere along our shores will one learn to appreciate more fully its usefulness as a sand binder than in the vicinity of Provincetown. The natural growth of Beach grass at this point has done much towards checking the progress of the sand dunes towards the town and harbor, the filling in of the latter being threatened by the moving of these great bodies of

sand. The Harbor and Land Commissioners of your State have undertaken to further check the drifting of these sands by transplanting Beach grass to the most exposed points, where presumably it will be most effective. The setting out of the Beach grass was undertaken in May last, and when I saw the plantations, in August, the operation was perfectly successful, and the best results may be confidently expected. This grass is the most valuable sand binder of our coast, and it should be made use of more than it is. We do not need to import the seeds of it, as has been done, nor do we need to depend upon seeds for propagation. The simplest way, and at the same time the most certain means of propagation as well as the cheapest in the end, is that of transplanting, which may be done in the spring, or in some localities doubtless in fall.[1] There is hardly any section along the seashore where Beach grass could not be used to advantage; if it does not exist near by, it may be readily and cheaply obtained. For the binding of embankments, where there is a proportion of good soil, Couch or Witch grass is available. If a good turf is desired, there is nothing better than Kentucky Blue grass, better known in New England as June grass.

There are in Massachusetts about sixty thousand acres of salt marsh, and it may be of interest to stop a moment to consider the plants that enter into the composition of the hay which these marshes afford. These salt grasses are the natural product

[1] The following letter from Mr. L. W. Ross is of interest in this connection:

BOSTON, MASS., March 30, 1896.

PROF. F. LAMSON-SCRIBNER, *Washington, D.C.:*

DEAR SIR: Agreeably to your request when I met you in Boston, I will say that I visited the Province lands at Provincetown, Mass., on March 25 and 26.

The plantings of *Ammophila arundinacea* which you saw last summer have proved a complete success. The winter has been an unusually windy and tempestuous one. Notwithstanding this, however, the plants have held the sand on the area planted securely in place and no "breaks" or "blow-outs" have appeared, to require any attention on the part of our Superintendent during the winter. This I consider somewhat remarkable, for we expected portions of it to be blown away. The whipping of the grass by the winds has broken off and blown away approximately about one-half of the bulk of grass above ground.

It has always been considered by those who claim a knowledge of Beach grass planting, that the spring season is the only one in which it should be planted. Last fall we continued the grass plantings beyond the point where we left off last spring, and contrary to claims made, at the present time it shows to be in better condition and to have stood the winds of the winter much better than the grass planted last spring.

Yours respectfully,

LEONARD W. ROSS,

Forester to Board of Harbor and Land Commissioners.

of the marshes, and the salt hay they furnish is a clear gift of nature, costing little beyond the labor and expense of harvesting. The cutting of the hay is determined more by convenience than by the selection of time when it would be most valuable for fodder, which would of course be when the principal grasses are in bloom; and the methods employed in harvesting are in many cases, and sometimes of necessity, quite primitive. The hay is cut, raked into small bundles, and carried to the stack, which is usually supported upon a circle of piles, raising it above the tides. During the winter season this hay is hauled away for use as fodder or litter or mulch, or shipped to the larger towns for packing purposes. On the higher and dryer marshes other methods of harvesting may prevail. The characteristic grasses of the marshes are the Spartinas. There are several species of these, and several of them have a very wide distribution along our coasts, and occur also upon the coasts of Europe. One of the largest of these Spartinas, growing where there is a daily flow of tide, chiefly along the ditches and creeks, is the common thatch or creek sedge. It is conspicuous by its size and its broad, spreading, shining leaves. It imparts a disagreeable flavor to the butter and milk from cows fed upon it, and is rarely used for fodder, but chiefly for thatch or litter. The finer variety of the same species is more widely scattered over the marshes proper, growing to the height of from one to two feet. This has narrower, more erect leaves, and is of a lighter green color. Like the large form, it imparts a disagreeable flavor to the milk from cows eating it. Red-salt or Fox grass is another Spartina; a smaller species with wiry stems and slender leaves, and is one of the best known of the grasses of the salt marsh, and one of the most valuable. It makes fairly good hay where better cannot be had, and is a particularly useful species for packing crockery and glassware. The diœcious Spike grass, less known than the others, but fairly common on the meadows, also furnishes good packing material. I saw this covering considerable areas on the low marshes at Cape Cod, the male plants and the female plants occupying separate areas, and conspicuous by the yellowish hue which they gave to the vegetation. It is interesting to note that the various grasses of the salt marshes do not ordinarily grow intermingled, as do the species which compose our meadows and pastures, but each holds exclusively areas of greater or less extent.

The largest and most striking of our native grasses, *Phragmites communis*, is occasionally found upon our salt marshes, although it is not limited to these localities. It is a species widely dispersed throughout the temperate regions of the world, growing along the margins of rivers and freshwater lakes. It has remarkably long and deeply penetrating roots, and is especially valuable as a sand and soil binder. There is a small area of this grass growing in the sands near the water's edge on Cape Cod, where it is exposed to the extreme action of the winds and storm tides. It has existed there for many years, and its power to withstand the elements and fix the sands is clearly demonstrated. While its foliage may not resist the cutting action of the blowing sands, as do the leaves of Beach grass, its power to resist the action of the waves is greater. Wherever the waves of the higher tides reach the sands occupied by Beach grass, it is soon destroyed.

Upon the higher portions of the marsh, which usually escape the ordinary tides, occur several fine grasses of excellent quality. Among these are the Creeping or Red Fescue, Sea Spear grass, Creeping Bent or Brown-top, and Black grass. The Creeping Bent or Brown-top is one of the best and most tender grasses for fodder which the marshes produce. It is only a variety of the well-known Redtop of our meadows, with stems which are more or less creeping at the base, and with a less spreading panicle. Sea Spear grass (*Glyceria maritima*) is not uncommon on the marshes of the New England coast, extending southward to New Jersey. It is a tender grass, liked by cattle, and when abundant makes a valuable addition to the salt hay designed for fodder. Red Fescue (*Festuca rubra*) is a native, and occasionally appears upon the marshes, although more abundant upon the sandy soil of waste lands bordering them. It is a grass of excellent quality, and often enhances considerably the value of marsh hay. Of all the grasses of the marshes proper, there is none more highly prized for hay than Black grass (*Juncus Gerardi*), which extends all along the Atlantic coast, from the Gulf of St. Lawrence south to Florida. This, as you will notice, is not a true grass, but a rush, its botanical characters being quite distinct from those of the Gramineæ. Its slender erect stems are from one to two feet high, somewhat wiry, yet soft and apparently palatable to stock. It contains less fibre and a higher nutritive ratio, as is shown by chemical analyses, than Timothy and Redtop.

A more familiar topic, and one of greater interest to the most of us, is the grasses of our meadows and pastures. They are the grasses which feed our cattle; they are the grasses which brighten and beautify the landscape. They are numerous in species, and a mighty host in individual numbers. I would it were possible for me to introduce to you the various members of the grass family which have made a home upon our soils. Each one has a history; each one has its peculiar characteristics, distinguishing it from its neighbors. Each one has its field of usefulness, and many of them stand ready to become far more useful, if we will but extend to them the helping hand which we have held out to the few cultivated grasses, to shield them from the attacks of enemies and rivals, and aid them in their struggle for existence. They are all beautiful in their gracefulness, and nothing adds more charm to the landscape than a field of waving grasses or a pasture of emerald turf. Did you ever stop to think of one of the prime features of these grasses which makes them so useful to man? It is this: their power to exist under repeated cuttings or under the continued grazing and tramping of stock. What other plants possess this quality, even to a slight degree? To graze or mow the turf-forming species, and walk or tramp upon them, instead of destroying them, apparently adds to their vitality, and surely improves their quality. This certainly seems like a provision in nature, directed by an all-wise Providence, for the good of mankind.

I must confine myself to a few species, those of greatest recognized importance for hay, for pasture, or for the lawn. The best wild or native hay grasses are Blue Joint, Fowl Meadow grass, a species of Glyceria, and one of the Muhlenbergias or "drop-seeds." These are valuable in the order named, and often afford in our low-lying meadows a large bulk of native hay of excellent quality. Like other species of grasses, they respond readily to good treatment, and the specimens I have here to show you, clearly exhibit their capabilities. Timothy, Meadow Fescue, Orchard grass, Rye grass, and Redtop are the chief and best known of the cultivated or so-called "tame" grasses for the production of hay. In the markets, Timothy is the recognized standard by which the value of other grasses is estimated. It is the farmer's gold coin, although it does not appear to me to be equal in some respects to other varieties. Its clean appearance, even

growth, fair productiveness, and easy propagation make it a favorite grass. The presence of Meadow Fescue indicates a good soil, and upon well-drained clayey lands it is one of the best grasses we can cultivate; it is alike good for hay and pasturage. Where the soil is more moist, but deep and strong, the Large Fescue (*Festuca arundinacea*) may be cultivated. It is one of the most productive of the hay grasses. Almost equally productive on soils suitable to it is Orchard grass, and by many of our farmers this is regarded as equal, if not superior, to Timothy. It has a serious fault, however, of growing in bunches or tussocks. It is not a turf former, and when cultivated the seed should be sown thickly, and it is a good plan to add some other species as a filler. This objectionable habit of Orchard grass may be overcome in a measure by heavily rolling the fields in early spring. Were it not for this tussock-forming habit, Orchard grass would make one of the best of grasses for pastures, because of the early and abundant production of tender leaves. Rye grass, so popular in England, has never come into much favor here, although it is usually recommended as an ingredient for mixtures designed for permanent pasture. On very rich soils, where the ground is fairly moist and the atmosphere humid, its productiveness is very large. It will make a fair turf if well cared for, and may be used alone for lawns, but not in mixtures. Redtop is one of the finest and best of our hay grasses, especially for low meadows, but is less productive than other sorts. The requirements of a good hay grass are productiveness, hardiness, and adaptability to the soil. It must also be nutritious, rich in flesh-forming elements, and possessing little fiber, and must be palatable to stock. I will not attempt to discuss here the question of mixtures for permanent or temporary meadows, further than to say that they must be based upon the conditions of the soil and climate and the wants of the farmer. Regard must also be paid to the time of or succession of blooming of the several varieties which may be sown.

Our pasture grasses are more numerous than those which yield us hay, and a just consideration of them would more than occupy the time of a single lecture. The most important kinds are Meadow Foxtail, Kentucky Blue grass, English Blue grass (*Poa compressa*), certain varieties of Redtop, and species of Fescue. Meadow Foxtail is one of the earliest, quite productive, and by

many is very highly esteemed. It is recommended in all mixtures compounded for the production of continuous herbage through the season. Kentucky Blue grass is a good turf former and a good pasture grass where the land is rich, but does best upon strongly calcareous soils. It is the grass which has made the pastures of portions of Kentucky and Tennessee so justly famous. English Blue grass is, I think, a better pasture grass for New England than Kentucky Blue grass. It will grow on a greater variety of soils. It will grow on soils so thin and poor that little else will grow. On good land its productiveness is scarcely inferior to that of Kentucky Blue grass, and it is equally tender and nutritious. It makes a very firm sod, and withstands the tramping of stock better than many other kinds. The cultivation of this grass in certain portions of Virginia has changed poverty-stricken districts to areas of wealth and prosperity. This has been effected by the cultivation of this English Blue grass and the raising of dairy stock. From my knowledge of New England pastures, I can think of no grass that I would more highly recommend. Lowland pastures should always contain Redtop in some of its varieties. It makes the cleanest, nicest-looking, and sweetest turf of any grass I know. The fine-leafed varieties should be selected for cultivation in pastures. Of the Fescues, Meadow Fescue is a valuable pasture grass, as already intimated, where the soil is good; and on sandy soils Red Fescue is an excellent variety. On the dry uplands Sheep's Fescue is perhaps one of the best species we can cultivate, associating with it English Blue grass.

There is nothing more pleasing to the eye or more beautiful than a well-kept lawn. There is nothing that speaks more strongly for the owner of a house than the lawn which fronts it. The lawn upon the outside should be like the carpets within, and be kept clean with equal care. It is capable of giving pleasure to vastly more people than can enter the door and see the beautiful Wiltons and moquettes, for every passer-by may enjoy it. A good lawn is one of the simplest things to produce, yet one of the most difficult; at least one may reasonably judge it to be difficult by the vast array of wretched failures that appear in almost every neighborhood. What the lawn needs is good turf, and the climate here is excellently adapted to the production of just such turf as is most desired. There are a great variety of

grasses which will produce turf of pleasing appearance under careful management, but this turf varies in fineness and quality, according to the species used to make it. We do not need any lawn mixtures to make a lawn. The worst initiative in the making of a lawn is the sowing of a mixed lot of seeds. The best turf I have ever seen was composed of single varieties in pure cultures, and their beauty fully warrants the extra care and expense necessary for their production. I am happy to be able to show you pictures taken in the most famous grass garden — or turf garden as the manager calls it — in this country. You have all heard of it, and some of you have doubtless met the genius who has developed it. This garden is tended with scrupulous care and given daily attention. Not a weed, not a blade of grass foreign to the variety cultivated, is allowed to appear in any of the plots, or if appearing it is at once removed. It is at all times beautiful, but under the slanting rays of an afternoon sun, the beauties of this garden are most clearly brought out. At a short distance it looks more like unrolled webs of carpet or bands of delicately and variously tinted ribbon, than anything else one can suggest; and here we are able to see the turf-forming qualities (under the treatment given them) of many grasses and of many varieties of a single botanical species. To study the texture of these is most interesting, and the illustrations which I have to show you will in a very faint degree bring out the differences of texture they exhibit. The finest and best varieties of turf, and consequently for lawns, are those of Festuca and Agrostis. Some of the forms of Agrostis are exceedingly fine, yielding what we may very properly term a "nap," almost as fine and soft as that of velvet. Some varieties of Festuca are no less beautiful and hardly less fine. How these grasses would thrive under the shade of trees I cannot certainly say, but I recall a remark made by Mr. Olcott when asked which would do best in the shade. It was: "Those that do best in the sun." While some may question the exact truthfulness of this remark, there may be more in it than we may at first suppose. But there are good turf grasses which will grow in the shade of trees, where the shade is not too dense and they are given a reasonable amount of care. These are Meadow Foxtail and the Various-leafed Fescue (*Festuca heterophylla*). Crested Dogstail is spoken highly of by some; also Rough-stalked Meadow grass

(*Poa trivialis*) and Wood Meadow grass (*Poa nemoralis*). If I were experimenting, I should use by preference the Various-leafed Fescue or Wood Meadow grass. Where the lawn is small, it looks best unbroken, but in those of considerable extent, trees and shrubbery may be added to adorn it, and with these ornamental grasses may be planted. There have been introduced into cultivation many grasses of special beauty and attractiveness which may be used with good effect singly or in groups upon the lawn. One of the finest of these and the most showy when in bloom, is the beautiful Pampas grass. Nothing surpasses the elegance of its light and silvery-tinted plumes. Where they will grow, some of the bamboos are used with good effect to decorate the lawns; and the large Arundo with its beautiful white-striped leaves, and the more common Eulalia, and forms of our own Phalaris, belong to the group of ornamentals. Then there are finer and more delicate species sometimes used for borders, and of these we may mention such as species of Love grass and the elegant little Brizas.

As in all families of any size or pretension we always find among the good members composing it a few black sheep, so it is with the grasses. As good as they are, as useful as they are, as beautiful as they are, there are some which by their conduct, by their selfishness, by their intrusiveness, have become obnoxious, and we call them weeds. The worst of these which the New England farmer has to contend with is Couch grass. There are others, but we will not mention names in so goodly a company. It sometimes happens that men who are very correct in all they do under the restraint of home influences and are counted among the elect, when removed from these influences, will stray from the path of rectitude. So it is with grasses. Our much-loved Kentucky Blue grass, which every one esteems as a good and useful grass citizen, has received a bad name away from home. In New Zealand and Australia its habits are such that it has come to be looked upon as a vile weed — a lawless outcast, despised by everybody.

Your President suggested that I tell you something of what we are doing in the Division of Agrostology. Well, the Division is devoted to the investigation of grasses, and, in addition, to the investigation of forage plants other than grasses. From what I have said already, it is evident that the work is broad, and

involves many special lines of study. The work is intensely interesting, and it is our purpose to make it useful to you all. Our main force at this time is directed to the preparation of a work in which shall be illustrated and described all the North American species of grasses, of which there are more than seven hundred. I am able to show you the character of the illustrations. They are all original, carefully drawn, and executed on wood. The descriptions will be drawn from the specimens, and it is no simple matter to classify these specimens into their proper species, as the botanists among you will understand. During the summer season we have agents in the field collecting the grasses of the country, grass seeds of the more promising native species, and live roots of grasses. These seeds and roots are being propagated in the gardens established by the Department; and at the same time the material thus gathered is distributed to other investigators with a view of widening our knowledge by cultural experiments at other points, or is used in making exchanges. We have a large correspondence that has to be attended to, and questions are asked us relative to the qualities of various grasses and the kinds to be sown in given localities. We try to answer all these questions, but occasionally one is asked which exceeds our ability to answer; for example, this, which was actually asked us: "What was the first principal grass that began to grow on what we know as the prairies of Illinois after the drift period or ice age, and the date, if known?" Such questions we are forced to refer to a higher authority. Then there are collections of grasses constantly being received from various sources, to be named; this work takes time, for often the collections come from regions where the species are little known and their identification involves much study. The care of our grass gardens consumes considerable time, and also the handling of the seeds and the duplicate collections. Our main work, to which our energies at present are chiefly directed, is, as just stated, the preparation of what may be termed the "Handbook of North American Grasses."

The subject selected for me was "Grasses." It is surely an interesting one, and I shall indeed have failed in my purpose if I have not succeeded in securing your interest in it. I have found it impossible to do more than to indicate the importance of grasses, or hardly more than to name a few of their uses or

suggest a few topics for research, almost any one of which would afford an hour's entertainment or profitable discussion. The investigation of grasses has engaged the attention of the ablest men of science, and the study of their development, their classification, their inter-relationships, and their relation to other plants and to man opens a field to philosophy. They constitute the wealth of nations; they feed the world; they minister to the higher esthetic tastes of mankind by their graceful and varied beauty; they heal the sick, and make glad the well.

Discussion.

The lecture was illustrated by means of the stereopticon; views were given of the gardens of the Division of Agrostology in Washington, where the experiments in propagation and cultivation of grasses are carried on; also views of the numerous species of grasses of which the lecturer spoke, some of which showed the type of the illustrations to be expected in "The Handbook of North American Grasses," now in preparation. Bundles of numerous species of grasses were laid out on the tables for examination, each bundle being carefully prepared and labeled with both botanical and common names.

Mrs. —— Wright said that reference had been made to the Buffalo grass of the plains, and asked whether this grass can be removed to other localities, and if so, whether its nutritious qualities will be the same.

Professor Scribner replied that Buffalo grass was cultivated successfully in the grass garden at Washington, but he could not say whether it became less nutritious.

In reply to another question Professor Scribner said that the best English lawns are composed of single varieties of grasses. When asked if Alfalfa was included among the grasses, he said that Alfalfa does not belong to the family of true grasses, but to the clover family; it is one of the most important forage plants of the country.

On being asked whether a lawn could be made of white clover Professor Scribner answered that such a lawn would be unique; he would prefer grasses, but white clover is often used with grass, and in this way will make a very pretty lawn. The color of its leaves is the same as that of some species of grasses. There is an astonishing variety of color in grass leaves; different tints

occur even in the same species. By planting grasses of various colors a mosaic might be made, if desired.

An unknown gentleman asked whether the line can be drawn between grass and other plants used for human food. The answer was that botanically the line can be drawn. Grass is popularly used in a very wide sense, often including clover.

Another questioner asked the origin of Couch grass. Professor Scribner replied that it is a native of this country and is also known in Europe. It is commonly thought of as a weed, but it gives good crops for a year or two, when it chokes itself out. It may be improved by harrowing the sod formed, as is done in the West.

Professor Scribner stated that "The Handbook of North American Grasses" will be published in the fall of this year.

Benjamin P. Ware asked what is the best grass for sod. The reply was that *Agrostis alba* var. *stolonifera* or Creeping Bent has been shown by Mr. Olcott to be the best for lawns. Mr. Ware then questioned about June grass or Kentucky Blue grass as compared with it. Professor Scribner replied that the Fescues make a firm, close sod. Kentucky Blue grass is very fine, but not as fine as the Creeping Bent or Rhode Island Bent.

Being asked if Sweet-scented Vernal grass is good in the lawn, Professor Scribner answered that it is a weed in any lawn.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 28, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

MANURING ORCHARDS.

By Professor EDWARD B. VOORHEES, Director of the New Jersey State Agricultural Experiment Station, New Brunswick, N.J.

My main purpose in this discussion of the question of manures for orchards is to show the necessity of studies and investigations concerning the food requirements of the various fruits, rather than to point out methods of practice that shall be

economical and systematic. We have suggestions from numerous sources in regard to the particular needs of particular kinds of fruit for plant food, but we have in the reports of our experiment stations and agricultural societies very few results bearing upon this subject which have been derived from actual experiment. It is quite natural, perhaps, that this should be the case, because fruit growing as a business, or on a commercial scale, is comparatively new, and because the character of the investigations necessary to be carried out in order to obtain reliable data must be continued. The development of fruit growing as a specific crop has, too, been gradual, and has found its first considerable increase in sections of the country within easy reach of good markets, and upon soils particularly adapted for the purpose, which, perhaps, furnishes another reason for a lack of scientific investigation along this line.

Fruit Crops and Grain Crops differ in Respect to their Needs for Plant Food. — It is obvious, too, that such specific results as have been obtained concerning the needs of general farm crops, as grain and grass, for specific plant food elements cannot be applied with any degree of accuracy to fruit crops, particularly the larger fruits, as pears, apples, peaches, grapes, and plums, because these differ from the cereals, grasses, and vegetables, first, in their habits of growth, second, in the character of the produce, and third, in their relation to soil exhaustion.

In the first place, farm crops, as a rule, require but one year for the entire processes of vegetation and maturation. For fruit crops, with but few exceptions, the purely vegetative processes continue for at least three years, and with many kinds much longer, while after the fruit-bearing period begins the vegetative processes do not cease, but are coincident with the growth and ripening of the fruit. In the second place, the product of the harvest, namely, the fruit, differs very materially in its character from that of ordinary farm crops which mature their fruit and die in one season, because a whole season is required for its growth and development; that is, it is necessary that there shall be a constant transfer of the nutritive juices from the tree to the fruit throughout the entire growing season, while the growth for each succeeding year of both tree and fruit is dependent upon the nutrition acquired and stored up in buds and branches, as

well as upon that which may be derived directly from the soil. In the third place, the relation of fruit growing to soil exhaustion is very different from that in general crop farming, because in orchards there is an annual demand for specific kinds and proportions of soil constituents; it is really a continuous cropping of the same kind; there is no opportunity, as in the case of ordinary farm crops, to correct the tendency to exhaustion by a frequent change of crops, or the frequent growth of those which require different kinds and amounts of plant food constituents.

Nitrogen, Phosphoric Acid, and Potash are the Elements needed in Manures for Orchards. — In studying methods of manuring orchards, however, it must be admitted that the general principles of manuring which apply to fruits, apply quite as well to farm crops; that is, the essential constituents of manures must be the same. A fruit tree will not make normal growth in a soil destitute of nitrogen. That nitrogen encourages leaf growth is a recognized fact, and, since trees grow by means of both leaf and root, its presence is required in the soil in order to promote the growth and extend the life of the tree. It is very evident, too, that potash is an essential constituent in the growth of fruits, not only because it constitutes a large proportion of the ash of the wood of the apple, pear, cherry, and plum, and more than fifty per cent of the ash of fruit, but because it forms the base of the well-known fruit acids; and in order to nourish a tree properly, as well as to insure proper ripening, phosphoric acid is also very essential, though it is apparent from such investigations as have been made that this constituent is relatively of less importance than for the cereals.

It is also a matter of common observation that, in the production of stone fruits particularly, lime is an important constituent. Its function seems to be to strengthen the stems and woody portion of the tree, to shorten the period of growth, and to hasten the time of ripening. Fruit trees growing on soils rich in lime show a stocky, steady, vigorous growth, and the fruit ripens well, while those on soils which contain but little lime, particularly the clays, appear to have an extended period of growth, the result of which is, that the wood does not mature and the fruit does not ripen properly.

The Need of Manures for Orchards. — It is argued by

many, and sometimes by those who should know better, that fruit growing is quite similar to growing trees; that the question of soil exhaustion is not a matter of very great importance, provided the soil is well cultivated, and that all soils contain sufficient quantities of the food elements to insure the relatively small available supply required from year to year.

It is admitted that on soils of good mechanical condition, well drained and cultivated, which are naturally adapted for fruit as well as other crops, because well supplied with the essential constituents, nitrogen, phosphoric acid, potash, and lime, the exhaustion arising from the continuous removal of crops will not become apparent for a long time, but it should be emphasized that it is only upon soils which possess these characteristics that the growth of fruit, even poor fruit, can be continued for any considerable period without the application of manures.

While we have abundant evidence of the need of manures for orchards, derived from our knowledge of the fact that even virgin soils possess, as a rule, a low rather than a high natural strength, and are, therefore, incapable of furnishing for a long time a sufficient amount of one or more constituents, I desire to present further evidence, derived, first, from experiments conducted to determine the relative needs of plant food by certain fruit crops, and second, from such results of actual practice as I have been able to collate.

The only completed experiment in this line is reported by the New Jersey Experiment Station on peaches.[1] This experiment was begun in 1884, and the results fully reported in 1894, though I shall only use the results secured up to 1894.

The object of this field experiment was to study the comparative effect of an annual supply of what was deemed a sufficient quantity of the best forms of the three plant food elements, nitrogen, phosphoric acid, and potash, when used singly and in various combinations; and of large applications of barnyard manure. The experiment included thirteen plots, each one-tenth of an acre in area, and containing thirteen trees. Each of the fertilized plots received an annual application of 150 pounds of nitrate of soda, 350 pounds of bone-black superphosphate, or 150 pounds of muriate of potash per acre, thus furnishing an equivalent of 24

[1] Annual Reports New Jersey Experiment Station, 1884–1894.

pounds of actual nitrogen, or 56 pounds of "available" phosphoric acid, or 75 pounds of actual potash on the three plots which received single elements, and combinations of these amounts of two of the elements on three other plots, and a combination of all, or a complete fertilizer, on one plot. In addition, two plots were not manured; one received land plaster at the rate of 100 pounds per acre; one barnyard manure, at the rate of 20 tons per acre, and one barnyard manure, at the rate of 10 tons, and lime at the rate of 50 bushels per acre.

Accurate records were kept each year of the health and vigor of the trees, and of the yield of the various plots. The soil — a clay loam with clay subsoil — was of medium natural fertility, responding readily to manures; its mechanical condition good, and fairly representative of the soil in the peach-growing sections in New Jersey.

At this point I will give detailed results and comparisons only in case of the plots without manure, with a complete manure, and with barnyard manure.

The average age of an orchard in our State is about eight years, during which period three full crops are usually secured. I therefore give the average yield in baskets for the average period of the life of the orchard for the whole period of the experiment and for the crop years.

I. — The Yield without Manure.

	Baskets per acre.
1884–1891, inclusive, 8 years, average per year	65.7
1884–1893 " 10 " " "	60.3
1887–1891 " (5 crop years) " "	105.0
1887–1893 " (7 crop years) " "	86.2

II. — The Yield with Complete Chemical Manure.

	Baskets per acre.
1884–1891, inclusive, 8 years, average per year	164.2
1884–1893 " 10 " " "	183.4
1887–1891 " (5 crop years) " "	262.8
1887–1893 " (7 crop years) " "	262.0

III. — The Yield with Barnyard Manure.

	Baskets per acre.
1884–1891, inclusive, 8 years, average per year	169.5
1884–1893 " 10 " " "	194.7
1887–1891 " (5 crop years) " "	271.3
1887–1893 " (7 crop years) " "	276.8

IV. — The Relative Yield in an Unfavorable Season.

	Baskets per acre.
1889 unmanured	10.9
1889 fertilized	152.5
1889 manured	162.5

The first point of importance and value observed is in reference to the number of crops that were secured. On the unmanured land, the crops secured after eight years were so small as to materially reduce the average for the whole period, while for the manured land the average for the whole period was not only not reduced, but very materially increased; that is, the crops secured on these after the trees on the unmanured land had practically ceased to bear were greater proportionately than those secured previous to that time. This was true both for the fertilized and manured land.

In the next place it is shown that the yield was very materially increased by the use of manures, either in the form of artificial or natural supplies, and the differences in yield derived from these two forms are very slight, indicating that very much smaller amounts of actual plant food in quick acting forms were quite as useful as larger amounts of the less available forms in which the food exists in natural manure products.

For the ten years, the fertilized plot received 250 pounds of nitrogen, 560 pounds of phosphoric acid, and 750 pounds of potash, while the yard manure plot received — assuming the average composition of yard manure — 2,000 pounds of nitrogen, 2,000 pounds of phosphoric acid, and 1,600 pounds of potash; yet with eight times as much nitrogen, nearly four times as much phosphoric acid, and more than twice as much potash, the yield was but 113 baskets greater, or 11 baskets per year. There was no material difference in the size of the trees on the two plots;

in both cases they were large and for the most part healthy, even when the experiment was concluded, which was not caused by the normal dying of the trees, but by the fact that the larger number of them were partially or wholly destroyed by a severe windstorm.

In the third place it is interesting to observe — and it is a point of great importance — the effect of an abundance of food in overcoming unfavorable weather or seasonal conditions. The year 1889 was extremely unfavorable, and the crop throughout the State was small. In this experiment the unmanured plot yielded at the rate of 10.9 baskets per acre, while the manured and fertilized plots both showed a yield exceeding 150 baskets per acre. The manure strengthened and stimulated the trees and enabled them successfully to resist such conditions as were fatal to the crop on the unmanured land.

This point is one that is seldom considered in calculating the advantages to be derived from proper manuring, though it is of extreme value, since the expenses of cultivation, trimming, and interest on investment are quite as great in one case as in the other.

Another experiment bearing upon this point, recently reported by the Cornell Experiment Station,[1] is also very instructive as indicating the need of manures for fruit trees, not only in reference to the amount removed, but also in reference to the proportions of the essential constituents required.

This study shows that the plant food contained in 20 crops of apples, of 15 bushels per tree and 35 trees per acre, and in the leaves for the same period, amounts in round numbers to 1,337 pounds of nitrogen, 310 pounds of phosphoric acid, and 1,895 pounds of potash. These amounts of plant food are compared with the amounts that would be removed by 20 years continuous cropping with wheat, assuming an average yield of 15 bushels of wheat per acre, and 7 pounds of straw to 3 bushels of grain, viz.: 660 pounds of nitrogen, 211 pounds of phosphoric acid, and 324 pounds of potash. By this comparison it is shown that the 20 crops of apples remove more than twice as much nitrogen, half as much again of phosphoric acid, and nearly three times as much potash as the 20 crops of wheat.

[1] Bulletin No. 103, "Soil Depletion in respect to the Care of Fruit Trees."

These results, although only applying strictly to the apple, are valuable in indicating the rate of soil exhaustion by fruit growing. It is to be remembered, however, that the larger root development of the tree would enable it to draw its nourishment from a larger area of soil than is the case with wheat, and thus probably permit of normal growth for a longer period.

THE EXPERIENCE OF PRACTICAL ORCHARDISTS. — The experience of practical fruit growers, particularly if they are successful, is also of value in this connection.

During the past year statistics were gathered in New Jersey concerning the methods of practice in fruit growing, and among the questions asked was, "The kind of manure used and the amounts applied per acre." The results obtained are instructive in showing, first, that orchardists do recognize the necessity of a liberal feeding of their fruit crops; and, second, that the rate of profit, other things being equal, is largely dependent upon such a practice, though the methods in use are widely different, and, in many cases, unsystematic and irrational.

I have selected those gathered in Burlington County, on pears and apples as illustrations, because they furnish good examples of progressive practice, and because those from other counties have not been finally tabulated. Of 169 growers of pears, representing an area of over a thousand acres, 162 use manures of some kind; 54 only barnyard manure, the application ranging from 5 to 15 tons per acre annually; 41 use commercial manures, exclusively, the larger part of which consists of ground bone and muriate of potash, the annual application averaging 600 pounds per acre; 33 use barnyard manure and fertilizers together, an average application of 11 tons of the former and 600 pounds of the latter per acre; 34 use miscellaneous home products, including lime, wood ashes, coal ashes, river mud, muck, etc.; and 7 only of the entire number do not manure at all. Of this whole number, 90 per cent report that fruit is the most profitable crop that they raise, the gross returns ranging from $50 to $600 per acre, with an average of $150.

Of 194 growers of apples, 183 use manure; 82 barnyard manure exclusively, at the rate of nine tons per acre; 30 both barnyard manure and fertilizer, at the rate of nine and one-half tons of the former and 500 pounds of the latter; 29 use fertilizer alone, chiefly bone and potash, at the rate of 700 pounds per acre; 8 use

barnyard manure and lime; and 34 use miscellaneous products. Their average gross returns are about $100 per acre, and practically every grower reports that the crop is a profitable one. We have here a practical unanimity of opinion as to the necessity of using manures, though a wide difference in practice in reference to the kind of material used, which is in many cases due to the relative cost of the various materials, rather than to definite opinions concerning their relative value.

The Kind of Manure to use. — The kind of manure to use may be discussed, first, as to whether it shall be natural or artificial, and, second, if artificial, the kind of materials and the proportions of the constituents most desirable. In reference to the relative usefulness of yard manure and the best forms of chemical fertilizer the data derived from the experiment on peach trees are instructive, and I simply add to that already given a financial statement showing the relative values of the crops secured, less actual cost of manures, and which does not include the cost of application.

V. — New Value of Crops from Fertilizer and from Natural Manures.

	Per year.
Unmanured, 10 years, value of crop, $301.85	$30 18
Fertilized, 10 years, value of crop, less cost of fertilizer, $810.20	81 02
Manured, 10 years, value of crop, less cost of manure, $673.70	67 37
Annual net increase from fertilizer	51 02
Annual net increase from manure	37 19

As has been already suggested, the amount of yard manure applied may have been much larger than was necessary, though it is very clearly shown that the use of chemical fertilizer, under the conditions obtaining in the experiment, was relatively more profitable than the manure; hence, while it is hardly safe to conclude that chemical fertilizers may in all cases be more profitable than the manure, it was shown in previous tabulations that chemical fertilizers did practically meet the demands for plant food; that is, the yield was but little greater from the use of barnyard manure.

In reference both to the kind of materials and to the proportions

of the constituents most desirable, we have to depend rather upon the opinion of experts than upon well ascertained data, though the Cornell experiment, already quoted, is interesting in that it throws considerable light upon the question of proportion of the various constituents. In this connection I shall quote the opinions of leading horticulturists.

In "Farmers' Bulletin," No. 33, of the Department of Agriculture, on Peach Growing, Erwin F. Smith, the author, under the caption "Fertilizers," says: "Some words are necessary on the use and misuse of fertilizers. Unless the trees are on strong land it will be necessary as soon as they come in bearing, and yearly thereafter, to give them each spring or autumn some special fertilizer. There can be no objection to the use of well composted barnyard manure. Where this is not procurable dependence must be put on clover and commercial fertilizers, taking care always that the latter are obtained from reliable sources. In general the dependence should be on potash salts and phosphates rather than on nitrogenous fertilizers. The peach can be injured readily by excess of nitrogen. Its effect upon the trees is to produce excessive growth of wood and foliage at the expense of the fruit. Fifty to a hundred pounds per acre of nitrate of soda or its equivalent in dried blood or sulphate of ammonia is usually as much nitrogenous fertilizer as any orchard requires, and many orchards do not need it at all. Muriate of potash, kainit, or sulphate of potash may be used in large quantities without injury. Four to five hundred pounds per acre will do no harm, provided it is not put too close to the trunks of the trees."

This opinion is based upon the results of studies to determine the relation of fertility to peach yellows, which were not continued for a long period.

In Bulletin No. 72 of the Cornell Experiment Station, Professor L. H. Bailey says:

"Nitrogen, potassium, and phosphorus are the elements which need to be applied to orchard lands.

"Nitrogen is particularly efficacious in promoting growth. In fact the amount of growth and the color of foliage are reliable guides for the application of nitrogen. Orchards are grown for fruit, not for forestry purposes. In general, it is better to supply nitrogen by good cultivation — which assists nitrification — and

an occasional green manure crop, than by the application of nitrogenous fertilizers. If the orchard is not growing and is yellowish in foliage, good cultivation — begun early and repeated very frequently — in connection with the use of potash, phosphoric acid, and green manures, will commonly correct it.

"Potash is generally the most important element to be applied directly to orchards, particularly after the trees have reached bearing age. The store of available potash in the soil is much increased by the thorough tillage which has already been recommended, but in bearing orchards it should also be supplied every year in some commercial form.

"In general, phosphoric acid is rather less important in fruit plantations than potash, although this order is reversed in general farming. Potash should undoubtedly be the leading factor in orchard fertilizers, and nitrogen, as I have said, may be obtained mostly by means of tillage and green crops."

Again, in Bulletin No. 74, Professor Bailey says:

"I believe that the keynote to the proper fertilizing of peach orchards is potash and phosphoric acid, and not nitrogen. Ashes, muriate of potash, bone fertilizers — these are some of the money makers for peach trees. Tillage, with green manure crops at the end of the season, can be relied upon to furnish nitrogen in most instances. I do not wish to disparage the use of nitrogen, for even in bearing orchards a direct application may sometimes be necessary; but I desire to state what I believe to be a fundamental consideration in orchard culture, that nitrogen can easily be used to excess and that it can generally be obtained by means of tillage and green manure, and also that potash and phosphoric acid need to be annually applied to orchards of bearing age."

The points contained in the above statement are again emphasized by Professor Bailey in Bulletin No. 102. These opinions of Professor Bailey are based largely upon theoretical considerations, verified by his wide observation.

Professor L. R. Taft, in Bulletin No. 103 of the Michigan Experiment Station, says:

"Of the three elements that are often deficient in the soil, potash, phosphorus, and nitrogen, it can be said that a rich virgin soil will generally contain all that is needed for an orchard, but after the trees have matured several crops of fruit, the available potash and phosphorus is likely to become so reduced that a satis-

factory growth cannot be obtained, and if the soil is in any way deficient in organic matter, the amount of nitrogen will probably be rather small. As a rule, a bearing orchard should have, once in two years, from 300 to 500 pounds of ground bone, 200 to 300 pounds of muriate of potash, and 150 pounds of nitrate of soda per acre; or in place of these 25 tons of decomposed stable manure will be beneficial if the soil is light. In addition to their value for supplying plant food, the chemical fertilizers have an additional value, which is, perhaps, equally important, as, by supplying soluble plant food early in the season, they enable trees to make their growth during the first of the season and ripen their wood thoroughly before winter. The growth is, as a rule, much more firm than that obtained by the use of stable manure, or from the natural fertility of the soil. In fact the chemical manures can be used as correctives, since if those containing potash and phosphoric acid are added to soils that have been highly enriched with stable manure, or that are naturally quite rich in organic matter, they will have a tendency to make the new wood more firm and compact. It can then be claimed that the proper use of chemical manures will increase the hardiness of the trees, and will both render the fruit buds less susceptible to sudden changes in the weather, and lessen the danger of their winter-killing."

These statements, while general rather than specific in character, agree in their main points: First, that orchards should be liberally fertilized; second, in giving preference to artificial manures; and third, in urging that great care be exercised in the use of nitrogen. Those in reference both to the unfavorable effect of too much nitrogen, and to the importance of superphosphate and potash salts, are in a measure verified by the New Jersey experiment already quoted, — that is, nitrogen used alone and, therefore, in excess, was not particularly useful, while the combination of phosphoric acid and potash was more serviceable than any other combination of two elements. The nitrogen was, however, of very great value when used in connection with the mineral elements, as the accompanying statement will show.

VI. — Money Value of Crops, Less Cost of Manure.

	Per year.
Unmanured, 10 years, value of crop, $301.85	$30 18
Nitrogen alone, 10 years, value of crop, $307.30 . . .	30 73

	Per year.
Phosphoric acid and potash, 10 years, value of crop, $725.65	$72 57
Nitrogen, phosphoric acid, and potash, 10 years, value of crop, $810.20	81 02
Annual profit from nitrogen alone	55
Annual profit from phosphoric acid and potash	42 39
Annual profit from nitrogen, phosphoric acid, and potash	50 84
Annual gain from addition of nitrogen to mineral elements	8 45
Annual gain from application of nitrogen alone	55

In this experiment the nitrogen was in the form of nitrate of soda, and because of the ready availability of nitrates was doubtless all absorbed early in the season, and thus did not encourage late growth of leaf and branch.

In this experiment, too, a continuous application of excessive amounts of organic nitrogen, while probably not of the greatest advantage, did not prove detrimental; the wood ripened well and the fruit, while maturing a little later in some cases, was quite as good as that from trees which received the nitrogen in the form of nitrates.

Suggestions as to the benefits of nitrogenous manuring are also furnished by the following examples of actual practice. I note these particular examples, because I have full knowledge of the facts.

One of the most productive and profitable peach orchards in our State is now twelve years old, and at present shows no signs of decay or loss of vitality. This orchard, with the exception of one year, has received annually per acre, since the bearing period at three years of age:

Nitrate of soda	200 lbs.
Ground bone	200 "
Acid phosphate	200 "
Muriate of potash	200 "

The exception noted is, that one year the nitrate of soda was omitted from part of the orchard; this omission, in the opinion of the owner, resulted not only in a considerable loss of fruit for that year, but in a diminution of the vitality of the trees, which

was very noticeable in the next crop, even though that year fertilized with nitrates as usual.

This orchard is situated in the peach region on soil well adapted for fruits, and was in a good state of fertility when the trees were planted. Orchards in the immediate neighborhood that were planted at the same time, and which were either not fertilized at all, or in a very unsystematic way, have all been removed, either because of the death of the trees, or because the crops received were not sufficient to pay for the labor of caring for the orchard.

It may be well to state, too, that this orchard, consisting of ten acres, has produced eight profitable crops; one crop returned a net profit of $200 per acre, while the average net profit for the whole period of the life of the orchard, now twelve years, is over $50 per acre.

Another orchard, situated on a sandy loam soil, which had been fertilized liberally with ground bone and muriate of potash only, showed signs of decay at the age of nine years. The spring of the tenth year a part of the orchard received, in addition to the bone and potash, 200 pounds per acre of nitrate of soda, and another part was seeded with crimson clover in the fall of the ninth year, which was used as a green manure crop in the spring of the tenth year. The effect of the added nitrogen was very striking, the trees revived, the color of the leaves changed to a dark green, and the fruit increased considerably, so that now, at the age of thirteen years, this fertilization having been continued in the meantime, it presents a healthy and vigorous appearance.

The third example is furnished by a pear orchard of ten acres, which has not missed a full and profitable crop since it came into bearing, now more than ten years, and is fertilized annually with one-half ton of an even mixture of ground bone and muriate of potash; it received nitrogen in the form of nitrate of soda in the earlier stages of its life, while for the past five years the nitrogen has been supplied through the means of green manures.

The practice of the Burlington County farmers is also in evidence as to the benefits of large and continued applications of nitrogen in the form of barnyard manure, since more than one-third of the whole number represented use this exclusively, while nearly all who use it find the practice profitable. It would seem, therefore, that the advantage of nitrogenous manuring is sufficiently well established, and that the chief questions are as to the

kind of nitrogen and the best methods of use. In the first place, the character of the soil must guide here, since soils differ both in their physical and chemical character, and hence in their ability to supply food. Sandy soils with sandy or gravelly subsoils represent a large class; they possess a fairly good physical character, but are very deficient in vegetable matter containing nitrogen, and in the mineral constituents, phosphoric acid and potash. On these, nitrogen supplied in the form of vegetable matter has proved of great advantage, both directly in furnishing nitrogen, and indirectly in improving the physical character of the soil, though it must be accompanied by an abundance of the mineral constituents, phosphoric acid and potash. If applied in the form of nitrate on this class of soils, there is great danger of loss from leaching.

Sandy or clay loams overlying clay subsoils of medium porosity represent another class. These are frequently of good texture, and richer in both humus and mineral constituents than the sandy. With good cultivation fruits make a normal and healthy growth, and do not show the need of nitrogen until crops are harvested; they are then much benefited by it, and it may be most economically applied in the form of nitrates, particularly if added in connection with the mineral constituents, phosphoric acid and potash.

The third class includes those which possess good physical qualities combined with a high natural strength, which comprise a relatively small area. Where such soils have not been subjected for a long time to exhaustive cropping, the growth and development of both tree and fruit proceed normally with minimum applications of manures.

In the second place, the natural mode of growth and development of the tree should guide in the use of nitrogen.

In all cases there should be sufficient nitrogen to provide for an abundant leaf growth early in the season, since the tree and fruit are dependent for food upon both the leaves and the roots. The supply of nitrogen, however, should be limited late in the season, or the foliage will hold too long, with a consequent late feeding, and the result that the new wood formed will lack hardiness and maturity.

Practical Suggestions. — A system of manuring for cultivated orchards, based upon the limited data at our disposal, may be outlined as follows:

To provide vegetable matter and to improve the physical quality of poor soils, apply yard manure once in four years, in fall or winter, at the rate of from five to ten tons per acre. To aid in the decomposition of vegetable matter, and to insure a sufficiency of lime as plant food, apply lime at the rate of twenty-five bushels per acre once in five years. To provide, in addition, an abundance of all forms of available plant food at the times needed for the development of the tree and fruit, apply annually chemical fertilizers in the following proportions:

Nitrate of soda	100 lbs.
South Carolina rock superphosphate	100 "
Ground bone	200 "
Muriate of potash	200 "

The amounts to be applied depend upon the character of the soils, as previously outlined, the kind of fruit, and the age and vigor of the trees; these given, perhaps, mark the minimum.

In a number of best orchards the quantities applied are very much larger than is here indicated, and the larger application is believed by the growers to be proportionately profitable.

By the recent introduction of crimson clover, we have a plant admirably adapted to supply cheaply nitrogenous vegetable matter for orchards, and its growth is to be recommended wherever the plant can be successfully grown, instead of the use of barn-yard manure, particularly upon the poorer soils, until they are abundantly supplied with vegetable matter. The clover should be ploughed down early in the season, in order not to retard the spring growth of the trees. Where the conditions are favorable for the growth of clover, the application of nitrate of soda may be omitted.

I have in this paper presented, as fully as my time allows, what in my judgment seems to be reliable information bearing upon the subject, and a careful review shows that it only emphasizes the statement made in the beginning, that there is urgent need of studies and investigations concerning the food requirements of the various fruits.

DISCUSSION.

Samuel Hartwell asked, "What is the comparative cost of manuring an orchard with barnyard manure and with chemical fertilizers?"

Professor Voorhees replied that twenty tons of yard manure, at $1.50 a ton, would cost $30, while the chemical fertilizers suggested could be bought for $11. In New Jersey commercial fertilizers are relatively cheap and city manures comparatively dear.

Mr. —— Clement said: "The Professor has stated that the life of a peach tree is eight years. Is not that rather a small number?"

Professor Voorhees replied, that it is, but that it is the age at which orchardists in New Jersey generally remove their orchards. It is a shorter time perhaps than it is here or farther south, but with our methods, when no manure or fertilizer is used, it has proved the time to stop.

Mr. Clement further asked whether the yellows were supposed to be helped or cured by the use of mineral fertilizers, to which Professor Voorhees answered, that this point was not borne in mind in the experiments. In some of the orchards which were reported to him as affected, it was found that the apparent yellows were often caused by a deficiency of food or by the root-louse. When a supply of nitrogen was given the yellow color usually disappeared and the tree assumed a healthy growth.

Being asked, "What proportion of nitrogen should be put into an application of wood ashes?" Professor Voorhees said that he would not recommend a mixture of nitrogenous matter and wood ashes, but rather that the ashes be applied in the fall at the rate of one ton per acre, and that the nitrogen be applied in spring in the form of nitrate of soda; as a rule the application should not exceed one hundred and fifty pounds per acre. An excess may give too much leaf growth. Nitrate of soda carries sixteen per. cent of nitrogen, so that there are twenty-four pounds of nitrogen in this application of one hundred and fifty pounds of nitrate of soda. Apply as early as possible, so that it may be in the tree in July. Turn green manure under very early — before June — for the same reason.

Thomas Harrison asked about applying nitrogen early in the life of the tree, and whether the amount given and the form of application should be varied in different years.

In reply Professor Voorhees said that there had been experiments on that point and that an excess of nitrogen gave more leaf and wood growth than was necessary, and the wood had to be cut back. Two hundred pounds of nitrate of soda per year seems to be too much to apply. He would not usually apply nitrogen before the trees begin to bear, but on very poor soils would apply it.

Notice was given of an extra meeting to be held on April 11, when William C. Bates would read a paper on "Mushrooms, Edible and Poisonous."

An invitation was also read from Samuel Henshaw, Secretary of the Boston Society of Natural History, to attend a meeting of that Society, Wednesday evening, April 1, when Professor William Libby would read a paper on "The Hawaiian Islands."

BUSINESS MEETING.

SATURDAY, April 4, 1896.

A duly notified Stated Meeting of the Society was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

Hon. George Heywood, from the Committee to prepare a memorial of the late Hon. John P. Spaulding, presented the following:

MASSACHUSETTS HORTICULTURAL SOCIETY, April 4, 1896.

The Committee appointed to prepare and present resolutions on the death of Hon. John P. Spaulding have attended to that duty and report:

Whereas the Massachusetts Horticultural Society has learned of the sudden decease of one of its members, the Hon. John P. Spaulding, of Boston,

Resolved, That the Society would most reverently recognize the wise though mysterious will of Providence by which it has been so recently deprived of one of its members.

Resolved, That this Society has lost a highly esteemed member, who by his many exhibits manifested a great interest in the

objects, usefulness, and prosperity of the Society; his beautiful grounds, filled with the choicest fruits, flowers, and vegetables, show that he was an ardent and scientific amateur in horticulture. In his death not only has this Society, but the community at large and the Commonwealth, city, and country, in many of their interests, lost a most estimable friend and a highly valuable citizen.

Resolved, That this Society tenders to his relatives its heartfelt sympathy in this their deep bereavement.

J. H. Woodford,
George Heywood,
Edwin A. Hall,
Committee.

The memorial was unanimously adopted.

The President read a letter from F. L. Harris, of the Committee to prepare a memorial of the late C. M. Atkinson, stating that the Committee had been unable to perform that duty and asking further time, which was granted.

The President laid before the Society two pamphlets on the diseases of Carnations, presented to the Library.

The following-named persons, having been recommended by the Executive Committee for membership in the Society, were, on ballot, duly elected:

William Caleb Loring, of Beverly.
Frank O. Carpenter, of West Roxbury.
Charles Jackson Dawson, of Jamaica Plain.
Mrs. William Farnsworth, of Dedham.

Adjourned to Saturday, May 2.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, April 11, 1896.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

The following paper was read by the author:

Mushrooms, Edible and Poisonous.

By William C. Bates, Vice-President of the Boston Mycological Club, Boston.

The Massachusetts Horticultural Society has now for many years devoted its resources and expert knowledge to the development in this community of a higher intelligence in regard to the growth, propagation, utility, and beauty of all forms of vegetable life — vegetable in its widest sense, including fruit, flower, and plant, and all the products of the vegetable kingdom. The time, intellect, and money of the Society have been devoted to these ends, that the life of man may have a wider, fuller, freer existence, and that his spiritual sense may be quickened by the revelation of the beneficent bounty of the all-mother Nature, and that the stress of man's daily wants may be somewhat lightened by the increased yield in quality and quantity of Nature's products.

It seems eminently proper, in view of this chosen work of the Society, that we should spend the hour in consideration of one form of vegetable life, Native Fungi, which, it is claimed, has within its own field great possibilities of beneficence in its adaptability as nourishing food for man. It has been well said that "he who makes two blades of grass grow where one grew before" is a benefactor of the race; it follows, then, that the revelation to the people of this country that tons upon tons of nutritious diet are spontaneously produced by nature and await each year man's consumption, is the duty of the mycologist and of every one who loves his fellow men.

We will consider the subject, Mushrooms, Edible and Poisonous, almost entirely from an economic point of view — that is, in relation to their value as a food product and in regard to their varieties and abundance in all parts of our country. Botanists have, for about a hundred years, been engaged in analyzing and classifying the fungi until upwards of one thousand species have been ticketed and labeled with scientific names, but it is only within fifty years that much attention has been paid to the esculent qualities of mushrooms, and much progress has been made in very recent years. Indeed, a dozen years ago there were probably not a score of mycophagists in England and America, — that is, persons who knew by their own experience the value of several species of mushrooms for food — eaters of mushrooms.

Mushrooms have been eaten since the earliest times, especially

in early Roman times, and have been used in large quantities and in considerable variety for two or three hundred years in Italy, France, Russia, and Germany. The common people of France and Italy depend upon mushrooms to supply their table at certain seasons of the year, and seem to have an intuitive knowledge of the edible species, although from ignorance of recent investigations mistakes still occur in those countries with fatal results. Mushrooms are gathered in the Himalayas and the Vale of Cashmere, dried, and shipped to Europe; Japan exports large quantities to China; Patagonians have them for an exclusive diet during part of the year; in New Zealand and Australia the consumption is very noticeable, and yet in this country the use of mushrooms has been confined to a very limited area, and until within a few years to a single species, and that not one of the most conspicuous, or, in the opinion of many mycologists, the most valuable, the mushroom of commerce, *Agaricus compestris*, with its several varieties. The reason of this is not far to seek: First, this mushroom is almost the only one, so far, which lends itself to artificial propagation, and so has become more generally known as an edible species than any other; and, second, because of a wholesome and necessary fear of bad results from eating poisonous mushrooms, for it is known to all that some are very injurious if eaten; in point of fact it is probable that every year there are from twenty to thirty deaths in the United States from this cause alone.

It may be argued from this that if the use of our native mushrooms is made more general and popular these fatalities will largely increase, and so instead of a blessing this new food product will prove a curse. This would undoubtedly be the case unless the knowledge of the poisonous species goes before and follows and surrounds all acquaintance with mushrooms, and this knowledge it is the aim of mycologists (and, it seems to me, of this Society) to make prominent and foremost in all speech, writing, or object lessons, by exhibition or photograph given upon this subject. It is necessary that the student of this subject shall be first frightened to death that he may afterwards rise into peace and satisfaction and eat his mushrooms without fear and trembling. How can this knowledge be obtained? Is there any rule or guide by which poisonous mushrooms can be known at sight and all danger eliminated, so that we may go forth into the fields or woods and

gather mushrooms in safety? There is but one way — we must *learn to know them;* that is, we must learn to know at sight certain edible mushrooms, and in the same way learn to know the poisonous species; there is no other way to pluck the flower safety from the nettle danger. This knowledge is not so difficult of acquisition as it seems; it is much easier than it was a few years ago. In recent years upwards of two hundred species of mushrooms have been tested, identified, and branded for all time and for all climates as edible, but perhaps the most notable service in this direction is the running to earth of the archenemy of all, the "deadly Amanita." To this species all the fatal results of mushroom poisoning are traced; it follows that if we can banish this species from our diet comparative safety is assured. It is due to Capt. Julius A. Palmer. Jr., to say that this segregation of the Amanita as the one cause of all mushroom poisoning has been for many years the burden of his speech and writings upon mushrooms; we owe much to him that it is now generally admitted that the Amanita is *the* one particular genus to be avoided, tracing to it most of the fatalities. This has come, too, not only from tracing to this species most of the cases of mushroom poisoning, but from failure to trace such fatalities to other species. This is not to say that all other mushrooms are edible; there are others that will be injurious, and others unfit for food; therefore it remains that those which are edible must also be learned "by heart," as we used to say in school; that is, to be known at sight. It would seem that if we have learned to know the Amanita, half our battle with ignorance is already won, and we are on the road to safety in gathering mushrooms. Let us see what progress we can make in this knowledge today and now.

Before turning to the photographs as aids in identifying the various species of mushrooms both edible and poisonous, let me recall the principal divisions of fungi which are to furnish this abundant food product of the twentieth century. There are the mushrooms with gills, laminæ, or plates, the most abundant and common form being the Agarici, known to all; mushrooms with pores on the under surface, the Boleti and Polyporæ; mushrooms with spines; and the miscellaneous, such as the Puffballs and Coral mushrooms. The Amanita belongs to the first class, the Agarici; it follows therefore that in the other species we are free from its dangers, though we shall have still to learn which of the

Boleti are fit and proper for food, and so with the others. The Agarici, or mushrooms with gills, are a large family, and we cannot part with them all on account of the Amanita, but must learn to get rid of it from our collections, leaving us free to gather the great variety of gilled mushrooms which are edible.

This brings us to some consideration of the manner of growth of mushrooms in general and of the Amanita in particular. Mushrooms may be considered as the fruit of the plant itself, the plant being a thread-like substance out of sight below the surface; the fruit is nature's method of maturing and distributing the seed or germ of new life, spores.

Mr. W. Hamilton Gibson, in his recently published work "Our Edible Mushrooms and Toadstools," has made all who follow him on this subject his debtors, and we shall have occasion to draw often from his beautiful and life-like plates, as well as from Captain Palmer's "Mushrooms of America;" from the Government reports of the Division of Microscopy, Department of Agriculture, and the English works of Mrs. T. J. Hussey and Rev. M. C. Cooke.

In a plate of Mr. Gibson's book we see the thread-like plant, the mycelium of the mushroom. At times, after rains or in the proper conditions of heat and moisture, the growth is quickened and these little knobs begin to grow and soon push above the surface with the appearance of a small egg. The successive stages of growth are well indicated in another of Mr. Gibson's drawings; in the first stage, the mushroom is enclosed in an envelope which is soon ruptured, but the envelope or volva leaves behind it, in the Amanitas, several indications of its presence, and these may well be called Nature's danger signals. As the mushroom grows a portion of the ruptured envelope adheres to the cap, another portion connects the cap at its edge with the stem, and another part remains at the base, a cup or sac from which the stem rises. As the cap expands these scales or warts remain upon the cap, the veil falls away from the cap and surrounds the stem, the sac remains at the base, and we have the complete *Amanita vernus*, a deadly poison, which Mr. Gibson has appropriately marked with the death's head and labelled "poison." This mushroom is one of the most attractive in appearance, pure white without distinct odor; it is very common, generally accompanying edible species, and would be likely to be the first selected

by the untrained person. The scales upon the top of the pileus or cap are missing at a later stage of growth, or would be rubbed off by contact; it will be seen therefore that if this mushroom were plucked by cutting above the volva at the base and placed with edible varieties it might give no indication of its deadly character and presence; hence the impossibility of accepting a miscellaneous basket of mushrooms without a certificate of character or an expert knowledge of what is not and cannot possibly be an Amanita. The rule of safety is, all Amanitas grow from a volva or sac, some of this genus are poisonous, therefore gather no mushrooms growing from a volva or sac. If there are scales upon the cap and a veil-like ring and the color is, as we have learned it, pure white, scarlet, orange, or yellow, we should look for the cup, and, as it is not always visible above the ground, pass the knife below the surface, taking care to lift the whole; we shall soon learn to recognize the Amanita family at a distance and keep them there. The *Amanita vernus* is pure white, but *A. muscarius* is orange, yellow, or scarlet, with scales or warts upon the cap, a distinct veil or ring and a volva, although Mr. Gibson notes it as often absent, indicated by a mere ragged line of loose, outward curved, shaggy scales around a bulbous base. Captain Palmer portrays it (the volva) as quite distinct. Probably both are right at different stages of growth. The student should not be content with verbal description, but should turn to the colored plates now available, become familiar with the named varieties as exhibited, — and for that purpose the exhibitions of this Society are invaluable, — and, if possible, when learning to know mushrooms, he should have in the season the practical instruction of an expert friend.

Now let us turn to a pleasanter phase of our subject, and consider some edible species which cannot possibly be mistaken for poisonous varieties. The number of edible species is much larger than is generally supposed; upwards of two hundred have been catalogued, and any mycologist should have an eating acquaintance with from fifty to one hundred kinds. The plate of twelve edible mushrooms from the report of the Agricultural Department for 1894, by Dr. Taylor, may fairly be put before the student as his task for a single season. If he accomplishes this, nature will ever after have a new meaning to him, and he will go forth to the fields and woods with a double and quadruple interest; his eyes will be

opened to new botanical wonders, and he will have a new appreciation of the bounty of Nature to her foster child, man.

[After these general remarks, the lecturer proceeded to describe carefully some of the leading species of edible mushrooms. These descriptions were made more interesting by the use of stereopticon illustrations.]

Agaricus campestris. The Meadow Mushroom. — There are many persons who will recognize this mushroom as the only one which they know and gather for food. *Agaricus campestris* is the most widely known, and by some thought to be the best of our native edible mushrooms. The new mycologist has no enmity to this well-known species; he simply claims that it is one of the many, and this knowledge is by no means as common as it should be. It may soon be learned, and ever afterwards be recognized at sight. It grows in open grassy places in fields and pastures, but not in the woods. The cap is whitish rather than white; brownish rather than brown; the gills beneath the cap, in its best condition, are pink, but soon become a dark brown; the margin of the cap extends a little beyond the extremity of the gills — folds over them, we might say. The flesh inclines to turn pink when broken; the stem has a woolly ring or veil. There are many varieties of this species, but none surpassing the *campestris* in flavor.

Agaricus arvensis. The Horse Mushroom. — This species is almost as common in the wild state, and more frequently met with, I think, in cultivation, as it grows much larger, and so yields a better return in weight. The comparative merits of the *campestris*, and several of those we have under consideration today, will not be settled for a long time. There are two sides to the shield; there is room for all in the gastronomic menu. The peculiar flavor of the *campestris* has come to be known as *the* mushroom flavor, but there are some to whom it is not agreeable, and they say, "Oh, I don't care for mushrooms." As well say, "I never eat meat," because the flavor of mutton is not agreeable. Mycophagists claim that there is as much variety in the flavors of mushrooms as in those of meats.

Tastes vary; it is said that in Rome the public censor or, whatever may be his title, the official inspector of mushrooms, condemns to the Tiber our favorite *Agaricus campestris*, but this may have been changed long ago. It hardly seems possible, for this species is known and used in Europe, Asia, and Australia. Its popularity

is increased, no doubt, by its being so easily recognized when once its characteristics are familiar, but the Common Mushroom is one of many, and we must pass on to other species.

Agaricus gambosus. St. George's Mushroom. — This mushroom will interest us as being due in April; in England it is called St. George's mushroom from the date of its appearance, St. George's Day, April 23. Whether this mushroom appears in this vicinity or not, our interest in the subject is too recent for us to have ascertained. Mr. Gibson speaks of it as common in this country; it is specially noticeable for its rank odor. The cap is from three to six or eight inches in diameter, first convex, then expanding and cracked; the color yellowish white, suggesting soft kid leather; the gills crowded, yellowish white, moist, of various lengths, and joined to the stem by a sharp downward curve; the stem stout and solid. It grows in fields, lawns, and pastures in rings or crescents, much like the Fairy Ring mushroom. Dr. Badham reports collecting from a single ring ten or twelve pounds, and in one field about twenty-five pounds of this mushroom. Farmers, ignorant of the economic value of this crop, take pains to eradicate it, fearing injury to the grass; how much better to take it home in a basket for the table, for themselves and neighbors. This mushroom, coming so early, growing in rings, having white gills, and a powerful odor, could hardly be mistaken for any other. Let us hope some one will report it as found in this vicinity before the end of April of the present season. Dr. Badham recorded: "It is the most savory fungus with which we are acquainted." Cooke gives an appetizing receipt for cooking St. George's mushrooms: "Place some freshly made toast upon a dish, and put the Agarics on it, pepper and salt and put a small piece of butter on each; then pour on each one a tablespoonful of milk or cream, and a single clove to the whole dish. Place an inverted basin over the whole, bake twenty minutes, and serve without removing the cover until it comes to the table, so as to preserve the heat and aroma."

Robinson adds: "A great quantity of gravy comes out of it, mingled in a good specimen with osmazome, which tastes very much like the similar exudation on the surface of a roast leg of mutton."

Agaricus ulmarius. The Elm Mushroom. — This mushroom appears on elm trees, sometimes in dense masses, is edible and

very palatable when young and therefore tender. A large mass was observed last summer on an elm tree in the yard belonging to the house of a club near here, whose members would presumably have enjoyed the succulent dish. The manner of growth of this mushroom is sufficient for identification.

Of a similar character is *Agaricus ostreatus*, the Oyster Mushroom, sometimes called the Vegetable Oyster. It is usually found in large clusters upon decaying stumps, joined sidewise to them by a short stem. Clusters of several pounds weight may be gathered from a single stump. The color is dull yellow or ash color, the gills dingy white. When young and tender this mushroom may be cooked in any way one would cook oysters, and the result will be equally agreeable and nutritious. Mr. Gibson has only seen this mushroom in autumn, but Dr. McIlvaine speaks of finding it from March until fall.

Agaricus cretaceus. The Chalk Mushroom. — This is a pure white mushroom growing on lawns and rich grass plots — never in woods. The cap, first globular, afterwards expands, becoming dark and smoky. It is quite brittle and the cuticle peels easily; the stem is hollow and parts easily from the cap without breaking the gills, a strong feature in identification. The flavor is mild. One should become acquainted with this species, though it is not so valuable or plentiful as some others that we have discussed.

Lepiota procerus. The Parasol Mushroom. — This mushroom is often described by enthusiasts as the best of all. The genus Lepiota is distinguished by a well developed ring, which soon breaks loose from its attachment and falls down, or may hang down upon the stem. The cap is distinct from the stem, that is, not joined to it by the gills, the stem being inserted in the cap in a distinct cavity or depression of the cap. The parasol has a dry, clean cap three or four inches in diameter with a distinct protuberance in the centre of the top; it is brown in color and has reddish brown scales dispersed somewhat regularly upon the upper surface of the cap. The stem is slender and five or six inches long, swollen at the bottom to a bulb; but without a sheath or volva. The gills are white; the smell and taste are pleasant and nutty. It grows singly in the open fields, sometimes under trees or by the roadside, and is found in summer and early autumn. The flesh is firm and, including the gills, of uniform thickness from stem to rim or from centre to circumference.

Two other species, *L. rachodes* and *L. Badhami*, are common in this vicinity, and are both edible. The parasol mushroom is best broiled quickly and seasoned to taste, while the *Badhami* or Saffron Lepiota is better stewed, when it yields a dark rich gravy. The Woolhope Club has recipes for Procerus pie, potted Procerus, Procerus ketchup, Procerus omelet, scalloped Parasol, Parasol sauce, etc.

Coprinus comatus. The Shaggy Mane Mushroom. — This species will always have a special attraction for me, it being the first mushroom which revealed itself to me after my eyes were opened to the possibility of learning to know for myself at least several species of edible fungi. There is no mistaking this mushroom for any other, and, if found in proper condition, that is, not too young or too mature, it would be folly to leave it ungathered. This mushroom has been called "the 'fungus of civilization,' as it is generally found near human dwellings." It seems to thrive on made land, possibly on account of the coal ashes frequently used for filling; consequently we find it on city and suburban lawns or vacant lots; generally on a rich surface of loam, but on new or made ground. It is generally found in clusters, though often springing up singly over a considerable area. Appearing above ground in shape like a pigeon's egg, of a dirty white color, as it develops it becomes elongated and cylindrical, five or six inches in height. The cap does not expand, its shape remaining that of an inverted tumbler; the top is covered with shaggy scales or threads. As the mushroom matures it melts into an inky fluid and sinks into the ground; even when gathered, instead of drying up, if left to itself it deliquesces into a dark slimy mass. In its perfect state the gills are white or of a rosy tinge, soon turning purple and black and so into an inky fluid. This mushroom has good edible qualities; it should be cooked soon after gathering — within twelve hours at least. The flavor is most rich and its texture most delicate when the gills show a pink color, with the margins turning to sepia. There seem to be two seasons to the Coprinus — at least to *C. comatus* — the latter part of May and early in June, and again in September and October, the autumn supply being much the largest. This shaggy mushroom is best cooked, I think, by stewing in milk or cream with butter, pepper, and salt.

Coprinus atramentarius, the Inky Mushroon, *C. micaceus*, and *C. congregatus*, were also mentioned.

Marasmius oreades. The true Fairy Ring champignon. — This is an edible mushroom of such marked characteristics as to be easily recognized. It flourishes in pastures with short grass, by the roadside and on lawns; never in the woods. It grows in rings, is of a bright buff color, somewhat tough, and with a solid stem. The gills are wide apart, ten or twelve to the inch, and of cream color. All authorities agree that this Fairy Ring mushroom is of excellent flavor. It may be dried and kept for years; it is sold in the London markets, being often picked by the bushel in England. The size is one or two inches in diameter, and when mature, in the centre of the top of the cap is a tiny elevation or mound. The gills curve upward and are quite free from the stem. Some mycologists think this the best of all mushrooms. It is the one referred to by Shakspeare in:

> "The nimble elves
> That do by moonshine green sour ringlets make
> Whereof the ewe bites not, whose pastime 'tis
> To make these midnight mushrooms."

The rings in which this mushroom grows widen from year to year and have been observed three hundred feet in diameter. This is a summer mushroom, extending sometimes into the early autumn. Very little care will serve to distinguish the true Fairy Ring mushroom from a relative which is not edible, the *Marasmius urens*, whose gills are crowded together, turning brown, and whose stem is more or less covered with down, especially at the base. The *M. peronatus*, another poisonous champignon, is found only in the woods. It has spines at the base of the stalk. These two species should be avoided.

The Russulas comprise a large family of edible mushrooms and when once learned are easily recognized. They are abundant in most parts of the country. They belong to the Agarics, having gills, — most species having even gills, that is, the same length, extending from the stem to the edge of the cap. The substance of the cap is quite brittle; the stem short and stout, solid, and tapering toward the base; no sign of a veil or volva at any stage. The taste, raw, is sweet and nutty; the color of the cap may be green, purple, pinkish gray, and various shades of red; the gills are

generally white or pale cream color. There are two special things to be avoided in gathering Russulas; this genus is in special favor with insects, and frequently it seems as if every one was infested in this way. The fastidious will reject all with any appearance of insect occupation, and this may occur between the time of picking and cooking; hence attention must be given to this at the last, just before cooking, by cutting in sections. The other difficulty in gathering Russulas is the danger of picking a noxious species, *Russula emetica*, the effects of which would at least be very disagreeable, and there is at present just one way recommended for detecting the presence of this species, viz., to taste a small piece of each specimen picked. *R. emetica* has an unmistakable hot, peppery taste, and must, of course, be thrown away. The Russulas are so abundant in woods from July to September and of such appetizing flavor when broiled, baked, stewed, or eaten raw, as to be well worth identification.

Lactarius deliciosus. The Orange-Milk Mushroom. — The milky mushrooms are a very common genus in our woods in July and August; they have the characteristic of exuding a milky juice unmistakable when seen. Several of the brown species are edible, and one of the most common, white and with gills very fine and close together, like a fine tooth comb, which is very liberal with its bitter acrid milk, is quite edible, its acridity disappearing in cooking. The most attractive of the milky mushrooms is *Lactarius deliciosus*, the Orange-milk mushroom. The cap is from three to five inches in diameter, and is generally of a dull reddish orange color, with banks or rings of darker red. The flesh, when bruised, exudes a juice of orange color or deep yellow, gradually turning green on exposure. It is found in woods, pine groves, and swamps from July to September. The taste when raw is slightly acrid, but this disappears in cooking. This is considered by all acquainted with it one of the most delicious of our edible mushrooms. I regret that my only summer of search has not brought it to my personal knowledge.

Hypholoma sublateritius. The Brick-Top Mushroom. — While many mushrooms are edible and should be sought after by those desiring additions to the larder, either from necessity or from epicurean motives, there are others which are not important enough to lead us to expect they will become a feature of the markets, owing either to their comparative rarity or lack of decided value.

The *Hypholoma sublateritius*, the Brick-top mushroom, may be classed in the latter category, though those familiar with its edible qualities will not pass it by. It grows in clusters upon or around stumps or on the ground covering decaying wood, and is found in the late autumn. The cap is of brick red color with paler edges; the gills are at first of a dull white, turning to olive green. It is slightly bitter when uncooked, but is excellent when stewed with butter, pepper, and salt and served on toast. It is often found after frosts, perhaps covered with leaves at the base of a stump.

Cantharellus cibarius. The Chantarelle. — If any mushroom deserves the title of Royal it doubtless should be given to this Chantarelle. Nero is said to have declared the *Amanita Cæsarea* to be food for the gods. Battara, an old writer on fungi, remarked, that "if properly prepared, the Chantarelle would arrest the pangs of death." This mushroom is of golden yellow in all its parts, like the dark yolk of an egg. It is about two inches in height and about the same in breadth, conical or funnel shaped. The flesh of the cap is firm and thick; the stem is of the same substance and equally good to eat. Instead of gills the under surface is composed of thread-like veins running down the stem, with smaller veins running transversely. The odor is delicate, like ripe apricots or plums; the flesh white, tinged with yellow. This Chantarelle may be stewed, fried, or broiled, combined with the meat of chicken or used in soup; in fact, it can hardly fail to excite the enthusiasm of the epicure. It grows profusely wherever it is found, generally in light woods and partially covered with leaves. My own particular preserve is within four miles of the State House, and the Chantarelle is found there from July to September inclusive. It may be readily dried for use in winter, and when one reflects that within the bounds of New England large quantities of this delicious mushroom must go to waste every year, utterly unknown and uncared for, it would seem as if a reward should be offered for its discovery and shipment to market.

There is a false Chantarelle, *C. aurantiacus*, growing in grass, in open places; not egg yellow, but reddish orange in color; the gills more like true gills than veins. In another species the gills are almost white, but neither of these would be mistaken for the true Chantarelle by one to whom it had once been familiar.

Boletus edulis. The Edible Pore Mushroom. — The name Boletus is now applied to those mushrooms which have a soft flesh

with vertical tubes underneath the cap. The tubes are round or angular; the cap horizontal and fleshy.

The *Boletus edulis* can hardly be mistaken for any other; the surface of the cap is smooth, the flesh white and unchanging; the tubes first white, then pale yellow, and later greenish yellow; the stem solid and quite thick. It is found in spring, summer, and autumn in pine, oak, and chestnut woods. It is sold in quantities in Italy, Germany, and Russia, and is dried for winter use, making an excellent soup. It is usual in England to cut away the porous under surface, using only the fleshy cap, but in young specimens, only two or three inches in diameter, the whole cap, including the pore surface, may be gathered and eaten. These Boleti may be found six or eight inches in diameter; young and smaller specimens are the best; "about the size of a penny bun" is the English standard. They remove the stem and pores, cut the fleshy cap into small pieces, place it in a covered dish with butter, pepper, and salt, and bake for an hour.

There are several species of edible Boleti, and it is noticeable that some which were condemned a few years ago are now known as edible. Such is *B. subtomentosus*, the flesh of which turns blue upon fracture, but there is no longer any doubt of the edibility of the species. Dr. Curtis placed it in his list long ago, and it has been often tried by Captain Palmer and Captain McIlvaine. Some mycologists incline to the opinion that all Boleti are edible if gathered in the proper condition; it is certain that a great number of valuable species are going to waste each year, from lack of attention by our people.

B. alveolatus and *B. felleus* are placed by Gibson among the suspicious Boleti. These may be easily avoided by amateur collectors, *B. alveolatus* having a crimson or a maroon cap, the tube surface the same, and the stem mottled yellow, red, and maroon. *B. felleus* has a pinkish flesh and is extremely bitter to the taste; the tube surface is white to pinkish in color. A sufficient acquaintance with these various Boleti can hardly be made without reference to the colored plates in Mr. Gibson's or Captain Palmers' book.

Strobilomyces strobilaceus. The Cone-like Boletus. — Another edible species which cannot be mistaken for any of the other Boleti, is the Cone-like Boletus. It is of a brownish gray color and has a shaggy surface with brown or black woolly points, the

pore surface grayish white becoming brown, the substance turning red when broken. It grows to four inches in diameter, and may be dried and kept indefinitely. It its found abundant within a few miles of the State House. Our Italian population have brought with them a knowledge of Boleti.

Lycoperdeæ or Puffballs. — The puffballs are easily recognized and cannot be mistaken for species of any other genus. They are among the most valuable of the edible mushrooms. There are several species, the most common in this section being *Lycoperdon saccatum*, with a diameter of three or four inches. It is filled with a soft white flesh when immature and at its edible stage; it changes to an elastic yellowish brown, cottony, and dusty mass, including the spores, which are soon blown broadcast by the winds. The Giant Puffball, *L. giganteum*, attains a diameter of one and even two feet. This mushroom is cooked by frying in a batter of egg and bread crumbs, or it may be stewed with some other mushroom, of which it will absorb the flavor. Puffballs must be gathered young, while they are white and pulpy; if turning yellow or powdery they are too old for use. It is the abundance of this mushroom in many parts of the United States which gives force to the assertion of mycologists that tons of good food go to waste annually in the United States. Puffballs are found from July to September in closely cropped pastures; sometimes in meadows and gardens. Dr. Curtis wrote of this fungus: "It is a general favorite with me, as it is indeed of all my acquaintances who have tried it. It has not the high aroma of some others, but it has a delicacy of flavor that makes it superior to any omelet I have ever eaten. It seems, furthermore, to be so digestible as to adapt itself to the most delicate stomach. It is the South Down of Mushrooms."

Fistulina hepatica. The Beefsteak Mushroom. — This mushroom is found on the stumps of oak, ash, and chestnut trees and probably approaches animal food more nearly than any other fungus. It is interesting to note that this species frequently appears from year to year on the same stump; it is well, therefore, "when found to make a note of it." It appears at any time during the summer season and grows to a tongue or palm shape, having the color of liver or beet, the under side being a pale yellow. It is attractive in appearance when in good condition and, as we say, "looks good enough to eat." When young it should be

sliced and broiled like steak, or minced and stewed. It lends to the homely hash an ethereal flavor which cannot fail to charm the summer boarder, and it also yields a voluptuous gravy which would have raised the spirits of Mrs. Todgers had she only known of it in her day. It is not a rare mushroom in this vicinity; the open eye will scarcely fail to meet it on any walk through woods abounding in stumps; "it varies in size from a few inches to several feet in circumference. A well-known mycologist, Mr. Bulkley, observed a specimen weighing twenty pounds; it has been called the poor man's fungus." This mushroom is utterly unlike the type ordinarily associated with the name; the under surface is like the Boleti, having pores or tubes closely joined but separating easily, and as small as pin holes. One of the best features is that this species is usually free from larvæ or insects. It projects from the stump without a stem, much as the pod of cocoa grows on its birthplace, and has more the appearance of a shelf.

Morchella esculenta. The Morel. — Another spring mushroom, found in many parts of the country, is the Morel, *Morchella esculenta.* This species differs materially in form from any of the before mentioned types. The whole plant consists of a cap and stem, but is quite different from those of the Agarics, Boleti, or Hydnei. The cap is deeply pitted on the outside with pits or hollows, the flesh being no more than an eighth of an inch thick. The method of bearing spores is unique, but the limitation of our subject will prevent a consideration of that phase. The Morels are all edible and are common in the markets of Paris in June. They are used in a dried state in London, and they should be better known in this country, as they are considered a great delicacy, and certainly grow in Massachusetts. The Morel is found growing in orchards, and is said to thrive in made land where ashes have been used for filling. It appears late in April and until June, and may be dried for later use. The hollow shape suggests a variety of methods for cooking. In Italy they are usually cut in pieces and stewed. Dr. Badham suggests filling the cavities with a stuffing of veal. Let us hope the time will soon come when this appetizing food product will not be left to go to waste. It is said in France that the Morel may be cultivated.

Hydnum repandum. The Hedgehog Mushroom. — This is a spine-bearing mushroom, as the genus Hydnum has spines instead of gills or pores, and so is easily distinguished. As we have shown

there can be no danger of poison in any of this genus. One of the most common, *Hydnum repandum*, is found in woods in the autumn. The cap is irregular in shape, depressed in the centre, and of a pale yellow; underneath the cap are the spines, crowded and running downwards, somewhat paler than the cap. The stem is solid, at first white, then turning a cream color, and is generally quite short. Ten or more may be joined together, by which the caps are irregularly formed. The flesh is thick, and the supply is quite plentiful in autumn. It may be sliced and dried and so made suitable for winter use. This species is in general use in France, Italy, and Germany, and is well known in England. There can be no doubt of its value as food, and it is equally certain that there is a large supply going to waste in this country from the lack of knowledge of its value. Uncooked, this Hydnum has a slightly pungent taste, and Dr. Cooke recommends its use in a sandwich instead of mustard or peppergrass. The Hydnum being dry and inclined to toughness should be cooked slowly. Dr. Badham finds them to resemble oysters in flavor. They are called Doeskin mushrooms in England and also Hedgehog mushrooms. There are several species of Hydnum, all edible; some grow upon wood; some from the ground in woods. One is called *H. coralloides*, and is described by Professor Peck as being abundant in mountainous districts from August to October.

Mr. Gibson describes at length *H. caput-Medusæ*, the Medusa's Head mushroom, and regrets having neglected to gather a fine bunch through ignorance, only to learn from Dr. Harkness that he "had thrown away five pounds of the most delicious fungus meat known to epicures."

Polyporus sulphureus. The Sulphurous Polyporus. — This is one of the many pored fungi; its color is a very striking feature, and it must have been seen by many of those accustomed to take their walks abroad through woods or to drive over shaded roads. How many have known it for a choice edible mushroom? It is not specified in the English works so far, I believe, but is well known to American mycologists. It is of a brilliant sulphur-yellow or orange-salmon color, growing in dense clusters upon a log, stump, or fence, — generally upon wood beginning to decay. Mr. Gibson speaks of a specimen weighing ten or twenty pounds. A young specimen is delicious and wholesome; the texture varies with age and becomes tough and woody at the base. It is easy, however,

to recognize the edible portion and proper condition. Some now present may remember a very fine specimen exhibited on the table of this Society last summer. This was tasted by several members of the Mycological Club with very gratifying results. The flesh may be stewed, fried in butter, or eaten cold as a salad, and on the whole may fairly be said to resemble the white meat of chicken. I am inclined to claim for it equal value as food. It is hardly possible to mistake this edible mushroom for any other, and, if not spoiled in cooking, it cannot fail to recompense whomsoever gathers it. Who shall say how many meals for a family go to waste annually within a stone's throw of some family whose worry would have been lightened by a knowledge of the food value of this mushroom?

Helvella crispa.— This mushroom is also little known in this country. It is allied to the Morel, its spores being enclosed before dissemination. The Helvella is an autumn fungus, and all the species are edible and easily recognized by their fluted hollow stem, flexible waxy cap, and the color — cream above and ochre beneath. It grows in woods during the late summer and autumn.

Armillaria melleus. The Honey Mushroom. — The Honey Mushroom is given in the reports of Dr. Taylor as edible. Cooke speaks of it as the most common and the most universally eaten on the Continent of all the stump mushrooms, and yet it has no favor in England; it is so common in this country as to be rated as a nuisance. All writers have placed this among edible fungi, but in the absence of any personal experience we will not insist upon its value as a food product. It is found growing on stumps, frequently in dense clusters, and if growing out of grass there is a bit of rotten wood beneath; the cap is of a honey-brown color and is about two inches across, darker in the centre than at the outer edge; the stem is rather long, paler than the cap, with a large spreading ring near the top. It is this which gives it the name Armillaria — "little bracelet." The spores are white and so profuse that grass, wood, and leaves beneath are soon covered with a coating of snow-white spores; this feature will help in its identification. More testimony is needed as to the value of this mushroom as a food product, though there is no doubt of its being edible, the question being, Is it esculent? This species is very interesting botanically, though this is somewhat apart from our present subject. Botanists have noted that it gives out a phos-

phorescence or luminosity from the mycelium, and that it is a very good illustration of symbiosis, that partnership existence by which two organisms live together for a time; the mycelium of the *Armillaria melleus* entering through the roots of a pine or spruce permeates the cells of the tree until the fungus is the only surviving partner, the tree dying.

A plate in Hartig's "Trees and their Diseases" shows this fungus growing from a pine stump, the tree having been killed by the association. Authorities differ as to its value as food. It seems desirable to have this matter further tested by mycologists, as it is a prolific species.

Clavaria. Edible Coral Mushrooms. — This genus seems to be plentiful in all parts of the country, and it is probable that all the species are edible, as it is certain the white ones are. Its growth resembles coral, and it should be tender and brittle when gathered; not sodden with moisture or yellow with age. It goes without saying that mushrooms are fit for food only when in good condition — that is, before decay has set in and before they are permeated with the larvæ of insects, the latter condition occurring very early with certain species, especially in the Russulas and Boleti. *Clavaria rugosa* is white, with the tips tinted a greenish gray. *Clavaria botrytis* may often be found the size of a cauliflower, with red tips. The Clavariæ are not to be despised or neglected, though they are not so important a genus of edible mushrooms as are many others, and when found in sufficient quantities and in size large enough to be gathered free from dirt are absolutely safe for eating. Timid people may well begin with the coral mushrooms. They may be dried and used in winter and may be fried in butter, stewed like oysters, or eaten raw as a salad. It is not attacked by the fungus worms, and is found in summer and autumn in woods.

These mushrooms now described and photographs of which have been thrown upon the screen are the most common of our native edible varieties, and should become familiar to all our people. The Massachusetts Horticultural Society will do much to extend this useful knowledge of nature's food product by opening its weekly exhibitions to contributions of mushrooms and by the offer of prizes upon special days for collections of named varieties, and this course has been adopted for the current year.

In reply to a question, the lecturer said that edible mushrooms in general are distinctly nutritious — much like meat, and should be considered as more than an agreeable delicacy; not merely as a luxury but as food for the poor, whose burden of providing food would be much lightened if this form were utilized.

STATION REPORTS WANTED.

husetts Horticultural Society is endeavoring to collect complete Bulletins and other publications of all the Agricultural Experiions in the United States and Canada. Those named below are and any person having a spare copy will confer a favor by address- Librarian of the Society, Horticultural Hall, No. 101 Tremont Street, on.

abama (Ag. and Mech. College Station). — Bulletins 4–6 (1884), 7–10 and 1–4 (1885), 5–9 (1886). Seventh Annual Report, for 1894.

Alabama (Canebrake Station). — All Annual Reports later than that for 1890.

Arizona. — Fourth Annual Report, for 1893.

Arkansas. — Bulletin 1. All Annual Reports later than the Fourth, for 1891.

California. — Bulletins 32, 1878, and 1, 2, 3, 5, and 50, New Series.

Colorado. — Bulletin 3.

Connecticut (New Haven Station). — Bulletins 1 to 67, inclusive. Annual Reports for 18[illegible]883, inclusive, except that for 1878.

Delaware. — All [illegible]eports later than the Fifth, for 1892.

Idaho. — All B[illegible]an No. 9.

Indiana (Purdu[illegible] of Ag.). — Bulletin 1. College Reports 1 to 14, inclusive.

Kentucky. — Bulletin 10.

Maryland. — Special Bulletin[illegible]nd K.

Michigan. — Sixth Annual Report, for 1892–93.

Missouri. — Bulletins 9, 13, 15, 16, 19, 20, 25, 26, and 33 of the Old Series. All Annual Reports since the First, for 1888.

New Jersey. — Bulletins 1, 4, 5, 15, 27, and 28.

New York (Cornell). — Annual Report, 1882–83 (Report of Agricultural Department of Cornell University).

North Carolina. — Bulletins 1 to 56, inclusive, and 69, 2d ed. Meteorological Division, Bulletin 2 (68*b*), and 2d and 3d Annual Reports, for 1888 and 1889. Special Bulletins 1 (77*a*) and 4 (82*a*). Weekly Weather Crop Bulletins 1–21, 1888; 1–24, 1889; 1–25, 1890; 2 and 4, 1891.

North Dakota. — All Annual Reports later than the Third, for 1892.

Ohio. — All Bulletins of the First Series, except 16, 17, 18, and 19.

Oregon. — All Annual Reports later than the Third, for 1890–91.

Pennsylvania. — Annual Reports for 1869, 1872, 1879–80, 1881, 1882, 1883, 1884, and 1885. [All issued by the State College.]

South Carolina. — All Bulletins of the Old Series (previous to 1888) on the work of the Experimental Farm of the South Carolina College. Third Annual Report, for 1890, and Sixth Annual Report, for 1893.

Texas. — College Bulletins 1–5, 1883–1887.

Virginia. — Bulletins 55–60, inclusive.

Washington. — Fourth Annual Report, for 1893–94.

West Virginia. — Special Bulletin, — Potash and Paying Crops, 1890. All Annual Reports later than the Third, for 1890.

Ontario Department of Agriculture, Toronto. — Bureau of Industries. — Agricultural Returns to the Ontario Bureau of Industries, Nov., 1882 (5th), Aug., 1883 (7th), and Nov., 1887 (20th).

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1896.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1897.

☞ SEE LAST PAGE OF COVER.

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, May 2, 1896.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

Frederick L. Harris, from the Committee appointed to prepare a memorial of the late Charles M. Atkinson, presented the following report:

Mr. C. M. Atkinson, the subject of this memorial, and for thirty-four years a valued member of the Massachusetts Horticultural Society, was born in Dorchester, England, in 1826, and in early life apprenticed himself to Mr. Campbell, near Exeter, Devonshire; from thence he went to James Veitch's nursery near by, and shortly afterwards assumed charge as foreman at Lord Sefton's, Clevedon. Leaving there he took charge of Pontey's celebrated nursery at Plymouth, Devonshire, where he remained, after marrying, until he decided to emigrate to America. He arrived in New York in 1857, and at once entered the service of Hovey & Co., at Cambridge, whose nursery at that time was celebrated throughout the United States and Europe for its collections of fruits and exotic plants.

Beginning in 1864, he managed the Cushing estate in Belmont three years, when he was appointed Superintendent of Mount Hope Cemetery. Owing to a change of administration there, he took charge of John L. Gardner's estate in Brookline, where he had an opportunity of identifying himself with the best interests of this Society.

As a successful exhibitor he had few equals, and his influence was felt by every one in competition with him. The grand specimens of Azaleas shown by him, six in number, had never previously been equalled by any grower; one of them, Decora, measuring eight feet by six feet. In hardy roses and hard-wooded plants the numerous medals and diplomas gained by him testify to his superior ability. In his death the Society loses one of its efficient aids; for, although considered as belonging to the old school of gardeners, he ever maintained a love for every new introduction, and was ever anxious, by precept and example, to engage others in furthering the objects of the Society.

After a long and active life, his health failing, he resigned his position with Mr. Gardner, January 1, 1895, having held it for a period of twenty-seven years. Marrying a second time, he passed the winter in Washington and returned to Boston in June, when he underwent a surgical operation (the second) and sailed for England. After his arrival there, the old trouble soon manifested itself, necessitating another operation, which terminated fatally. His body was brought to Boston and interred in the family lot in Walnut Hill Cemetery, in Brookline, Thanksgiving Day, 1895.

We are sure the Society will express its sympathy with the widow and only son by sending to them a copy of this memorial.

PATRICK NORTON,
F. L. HARRIS,
KENNETH FINLAYSON, } *Committee.*

The memorial was unanimously adopted.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

LANDER M. BOUVÉ, of Brookline,
HENRY R. STEDMAN, M.D., of Roslindale,
MICHAEL H. WALSH, of Wood's Holl,
GEORGE D. MOORE, of Arlington.

Adjourned to Saturday, June 6.

BUSINESS MEETING.

SATURDAY, June 6, 1896.

This was the day to which the last meeting of the Society adjourned, but no quorum was present, and the

Meeting was dissolved.

BUSINESS MEETING.

SATURDAY, July 11, 1896.

A Stated Meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The decease of M. Léon Say, President of the National Horticultural Society of France, was announced, and the President stated that he had written a letter to the Secretary of the French Society expressive of the appreciation by this Society of the loss sustained.

The Secretary announced the decease of Andrew S. Fuller, of Ridgewood, N. Y., a Corresponding Member of the Society, and one of the most eminent practical horticulturists in the country, as well as the author of valuable horticultural books, and moved the appointment of a committee to prepare a memorial to him. The motion was carried, and the President said that he would announce the Committee later.

The Secretary also laid before the Society a letter from Mrs. C. M. Atkinson, expressing her gratitude for the testimonial to her late husband, and for the sympathy felt by the Society in the loss which his family has sustained.

A vote moved by Joseph H. Woodford, concerning the compensation of Committees, was referred to the Executive Committee.

The following named persons, having been recommended by the Executive Committee, were on ballot elected members of the Society:

GEORGE E. WHITTIER, of Groton,
E. F. SEARLES, of Methuen,
FREDERICK E. CLARKE, of Lawrence,
MISS ELEANOR J. CLARK, of Pomfret, Conn.

Adjourned to Saturday, August 1.

BUSINESS MEETING.

SATURDAY, August 1, 1896.

An adjourned meeting of the Society was holden at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

Agreeably to the Constitution and By-Laws the President announced the following Committee to nominate candidates for Officers and Standing Committees of the Society for the next year:

WILLIAM H. SPOONER, *Chairman.*

BENJAMIN M. WATSON,	PATRICK NORTON,
SAMUEL HARTWELL,	HENRY W. WILSON,
BENJAMIN P. WARE,	C. MINOT WELD.

Adjourned to Saturday, September 5.

BUSINESS MEETING.

SATURDAY, September 5, 1896.

An adjourned meeting of the Society was holden today at eleven o'clock. The President and all the Vice-Presidents being absent, the meeting was called to order by the Secretary, and Ex-President WILLIAM H. SPOONER was chosen Chairman *pro tem.*

Mr. Spooner, as Chairman of the Committee to nominate candidates for Officers and Standing Committees for the year 1897, reported a printed list, which was accepted, and it was voted that the Committee be continued and requested to nominate candidates in place of any who might decline before the election.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, October 3, 1896.

A Stated Meeting of the Massachusetts Horticultural Society, being the Annual Meeting for the choice of Officers and Standing Committees, was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The Secretary stated that the meeting had been duly notified to the members of the Society, agreeably to the Constitution and By-Laws.

William H. Spooner, Chairman of the Nominating Committee, reported that that Committee had nominated Arthur H. Fewkes as a member of the Committee on Plants, in place of William Robinson, deceased since the last meeting. The report was accepted.

Agreeably to the Constitution and By-Laws, the President appointed Azell C. Bowditch, Hon. Aaron Low, and A. A. Kingman a Committee to receive, assort, and count the votes given, and report the number.

It was voted that the polls remain open two hours. The polls were opened at ten minutes past eleven o'clock.

The President, as Chairman of the Executive Committee, presented the following report:

At the meeting of the Society on the eleventh of July last, the construction of the vote establishing the compensation of Committees was referred to the Executive Committee. Said vote was passed February 14, 1891, and is as follows:

"One hundred dollars to each of the six Chairmen, and one dollar each for other members whenever they attend as required by the Schedule, an account to be kept by the Chairman."

The Executive Committee report that this subject was brought to their attention at their meeting on the 25th of January last, when they adopted the following vote:

"*Voted*, That in the opinion of the Executive Committee, the construction of the rule is that the one hundred dollars covers all remuneration to the Chairmen of those six Committees."

The Executive Committee have now to report that at their last meeting, on the 25th of September, the subject was again carefully considered, and that they saw no reason to change the position taken on the 25th of January.

The report was accepted and adopted.

Joseph H. Woodford objected to the report, and wished his objection recorded. It is as follows:

By vote of the Society at a previous meeting, voted to pay one hundred dollars for the services of the Chairmen of the working

Committees and one dollar for each committee man when called together by the chairmen.

The Executive Committee have decided not to pay certain members of the Garden Committee for their services on that Committee, and I hereby object to that decision and enter at this time my protest.

JOSEPH H. WOODFORD.

Michael H. Norton announced the decease of William Robinson, and moved that a committee of three be appointed by the Chair to prepare memorial resolutions. The motion was carried, and the Chair appointed as that Committee Frederick L. Harris, Michael H. Norton, and William J. Stewart.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

CARL BLOMBERG, of North Easton,
HOLLIS WEBSTER, of Cambridge,
JAMES H. DUNLAP, of Nashua, N. H.,
OTIS E. WELD, of Boston,
EDWARD J. MITTON, of Brookline,
MATTHEW S. HIGGINS, of East Bridgewater,
MISS ALICE B. CARY, of Lexington,
ELIHU G. LOOMIS, of Bedford,
WILLIAM S. H. LOTHROP, of Boston,
JEROME JONES, of Brookline,
COL. FREDERICK MASON, of Taunton,
CHARLES H. MOSELEY, of Dorchester,
CHARLES U. COTTING, of Boston,
ABNER J. MOODY, of Boston,
ROLAND W. TOPPAN, of Malden,
FREDERICK STRONG MOSELEY, of West Newbury,
HENRY STURGIS GREW, of Boston.

The polls were closed at ten minutes past one o'clock, and the Committee to receive, assort, and count the votes, and report the number given, reported the whole number of votes cast to be seventy, and that the members named in the ticket reported by the Nominating Committee had a plurality of votes and were elected.

The report of the Committee was accepted, and the persons named on the above mentioned ticket were, agreeably to the Constitution and By-Laws, declared by the President to have a plurality of votes, and to be elected Officers and Standing Committees of the Society for the year 1897.

Adjourned to Saturday, November 7.

BUSINESS MEETING.

SATURDAY, November 7, 1896.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

O. B. Hadwen, Chairman of a Committee appointed to prepare a memorial of Andrew S. Fuller, of Ridgewood, N. J., made the following report:

IN MEMORY OF ANDREW S. FULLER.

By the death of Andrew S. Fuller, this Society has lost one of its most valued Corresponding Members, and horticulturists a brother who has devoted a long life to the advancement of both the science and the practice of their art. He was an enthusiast in promoting the cultivation of fruits; and his published works were among the first containing elaborate experimental information relating to the propagation and cultivation of that extensive class commonly known as small fruits, and are justly recognized by the large class of growers engaged in that branch of horticulture as standard works. He has been the means of stimulating the vast cultivation pursued all over our country, and of elevating the industry to its present advanced standard.

Mr. Fuller's work, "The Forest Tree Culturist," is a most valuable acquisition to this branch of agricultural industry, at present in its infancy, but destined, as time goes on, to improve a vast area of land now comparatively worthless. This work has awakened a more general interest, which slowly but surely will benefit the whole country as well as those who are immediately engaged therein. Those of the Society who have personally known Mr. Fuller, and have seen him at the meetings of the American Pomological Society, when being held in Boston and

other cities, remember him as a gentleman of fine and cultivated personality, charming in conversation and anecdote, and abounding in those gentlemanly qualities, gained during a long life among his trees, fruits, and flowers, which rendered him preëminently a benefactor to the horticultural age in which he lived.

Though he has passed away, his works are still with us, to impart practical knowledge not only to the present generation of men, but to generations to come. We mourn his loss not only as a Corresponding Member of this Society, but as an experienced and valued contributor to the advancement of the science and art of Horticulture. His manifold ability and industry have placed him well in the lead of writers on horticultural subjects; and the wide circulation of his books has made him justly renowned. He impressed one as a man who thoroughly understood and enjoyed horticultural life; he was noted for his fondness for giving trees and plants to his friends, and for his readiness ever to extend a helping hand to all striving to advance in horticultural pursuits.

Mr. Fuller was elected a Corresponding Member of this Society in 1869. His memorial is found in our Library not only in his own works, which he sent to it as they appeared, but in a copy of Gerard's "Herbal" presented by him.

O. B. Hadwen,
J. Woodward Manning,
Robert Manning,
} *Committee.*

The memorial was unanimously adopted, and it was ordered that it be entered on the records, and that a copy be sent to the family of Mr. Fuller.

William J. Stewart, from the Committee to prepare a memorial of the late William Robinson, presented the following report:

William Robinson came to this country in 1877, at the age of twenty-six, already favorably known for his skill in the higher branches of gardening, and at once assumed charge of the greenhouses and grounds of the late Frederick L. Ames. Under his management the collection of rare Orchids in this place soon became well known, and at the time of his death, on the 16th of September, 1896, it had attained the distinction of being the most extensive and valuable collection of the kind in America.

From the first, Mr. Robinson manifested a lively interest in local horticultural matters. In the meetings and exhibitions of the Massachusetts Horticultural Society he found congenial surroundings. Ambitious, energetic, and impetuously enthusiastic, he quickly became influential among his brother gardeners, arousing life and activity in those with whom he came in contact, commanding from all that respect to which he was entitled as a leader and expert in his profession, and from many of us a deep and tender appreciation of his sterling manly qualities, his generous, sympathetic nature, and his fidelity to every trust reposed in him.

He became a member of this Society in October, 1883, but had already won many honors as a contributor to our exhibitions. The records of the Society show him to have won many Silver Medals and Certificates not only for Orchids, but for superior skill in the cultivation of difficult Stove Plants and Ferns. Many of the rarer Orchids, such as *Phalænopsis grandiflora aurea* and *Cypripedium insigne Sanderæ*, were bloomed by him for the first time in America, the latter having won the highest possible award, the Gold Medal of the Massachusetts Horticultural Society. Many beautiful seedling Masdevallias, Cypripediums, and Cattleyas also attest his skill. For the last five years he had been a member of the Plant Committee.

We, therefore, do hereby record our recognition of his inestimable services in the cause of horticulture; of the honor and prestige which he was instrumental in bringing to this Horticultural Society; of his worth as a citizen and his manliness of character, gratefully yet sadly adding his name to the lengthening list of those who, having each in his allotted sphere endeavored to perform faithfully his whole duty, now rest from their earthly labors.

Respectfully submitted by the Committee,

FREDERICK L. HARRIS,
MICHAEL H. NORTON,
WILLIAM J. STEWART,
Committee.

This memorial also was unanimously adopted, and it was voted that it be entered on the records, and that a copy be sent to the family of Mr. Robinson.

The President, as Chairman of the Executive Committee, re-

ported a recommendation that the Society make the following appropriations for the year 1897, viz.:

For Prizes and Gratuities:

For Plants	$2,000
" Flowers	2,600
" Fruits	1,800
" Vegetables	1,200
" Gardens	500
Total for Prizes and Gratuities for the year 1897	$8,100

These amounts are the same as those for the year 1896, except that for Vegetables, to which $50 is added.

The Executive Committee also recommended the following appropriations, all being the same as those for 1896:

For the Committee on Lectures and Publications, this sum to include the income of $50 from the John Lewis Russell Fund	$300
For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee	400
For the Library Committee, for the purchase of Magazines and Newspapers, Binding of Books, and Incidental Expenses of said Committee	400
For the Committee on School Gardens and Children's Herbariums, this sum to cover all Incidental Expenses of said Committee and to be paid through the usual channels	250

This report was accepted, and, agreeably to the Constitution and By-Laws, was laid over for final action on the first Saturday in January next.

The Executive Committee also reported a recommendation that the Society request the Vegetable Committee to exercise strict care in the exhibitions of Fungi, with special reference to those labelled " Edible."

This recommendation was adopted.

William J. Stewart presented the following vote:

Voted, That the Vegetable Committee be requested to provide exhibition cards, distinctly colored (red or otherwise) and having

the word "Poisonous" plainly printed thereon, and that exhibitors of Fungi not known to be edible be required to use these cards in labelling all such exhibits when shown in Horticultural Hall.

This vote was passed in the affirmative.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

HON. CHARLES F. SPRAGUE, of Brookline,

GEORGE E. STONE, Professor of Botany in the Massachusetts Agricultural College, Amherst.

Adjourned to Saturday, December 5.

BUSINESS MEETING.

SATURDAY, December 5, 1896.

An adjourned meeting of the Society was holden at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The Annual Report of the Committee of Arrangements was read by Joseph H. Woodford, Chairman, accepted, and referred to the Committee on Publication.

John G. Barker, Chairman of the Committee on Gardens, made a partial report from that Committee, being the awards of Prizes and Gratuities for the year, for which, he stated, there had been more competition than in most years. This report was also accepted and ordered to be placed on file.

The Annual Report of the Library Committee was read by William E. Endicott, Chairman, accepted, and referred to the Committee on Publication.

William J. Stewart, Chairman of the Committee on Establishing Prizes, presented the Schedule of Prizes for 1897, and explained the most important changes in the Rules and Regulations, and also in the offer of Prizes. This report was accepted, with the provision that a vote of the Society concerning special prizes offered by individuals be complied with, and that it then be printed as the Schedule of Prizes for the year 1897.

J. Woodward Manning, Chairman of the Committee on Flowers, stated that the Annual Report of that Committee was ready, but

that he was unable to bring it with him, and would read it at the next meeting.

The Secretary announced the death of Samuel G. Damon, and it was voted that a committee of three be appointed by the Chair to prepare a memorial. The Chair appointed as that Committee Benjamin G. Smith, E. W. Wood, and Charles F. Curtis.

The President read the draft of a letter to the President-elect of the United States, concerning the appointment of the Secretary of Agriculture. It was unanimously voted that the letter be adopted as an expression of the views of the Society, and that the President be authorized to transmit it to the President-elect of the United States.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

Hon. John Simpkins, of Yarmouthport,
B. Preston Clark, of Cohasset,
William V. Kellen, of Marion,
John G. Wright, of Brookline,
Miss Sarah L. Arnold, of Newton Centre,
James C. Scorgie, of Cambridge,
John W. Clark, of North Hadley.

Adjourned to Saturday, December 12.

BUSINESS MEETING.

Saturday, December 12, 1896.

An adjourned meeting of the Society was holden at eleven o'clock. The President and Vice-Presidents being absent, the meeting was called to order by the Secretary, and Patrick Norton was chosen Chairman *pro tem.*

The Annual Report of the Committee on Fruits was read by E. W. Wood, Chairman, accepted, and referred to the Committee on Publication.

The Annual Report of the Committee on Plants was presented by Azell C. Bowditch, Chairman, but as he was suffering from a

severe cold he was excused from reading it, and it was referred to the Committee on Publication.

J. Woodward Manning presented his report as Chairman of the Committee on Flowers.

John G. Barker presented his report as Chairman of the Committee on Gardens.

A portion of each of these reports was read, and they were then severally referred to the Committee on Publication.

Robert Manning read his Annual Report as Secretary and Librarian, which was accepted and referred to the Committee on Publication.

The following vote, moved by Joseph H. Woodford, was passed:

Voted, That the President instruct the Treasurer to pay all warrants issued or to be issued by the Chairmen of the various Committees to all persons serving on a Committee, irrespective of whether they are Chairmen of other Committees or not.

Henry L. Clapp, Chairman of the Committee on School Gardens and Children's Herbariums, read the Annual Report of that Committee, which was accepted and referred to the Committee on Publication.

The meeting was then dissolved.

REPORT

OF THE

COMMITTEE ON PLANTS,

FOR THE YEAR 1896.

By AZELL C. BOWDITCH, CHAIRMAN.

The exhibitions for the past year have shown a marked improvement, both in the number of exhibitors and also in the skill and care bestowed on the cultivation of the plants shown.

The capacity of our halls has been severely taxed at our larger shows, your Committee being obliged to crowd the large collections to an extent which greatly injured the effect of many of the collections and specimens exhibited; but as this matter is in competent hands we trust in the near future to find ourselves in more commodious quarters.

Your Committee take this opportunity to mention some of the most worthy exhibits during the season:

The first exhibition was held on the 11th of January, when William Thatcher and D. F. Roy showed some fine plants of an improved strain of Chinese Primrose.

On the 1st of February Robert Cameron (gardener at the Botanic Garden of Harvard University) exhibited a fine plant of *Angræcum sesquipedale* with twenty-five flowers, which was the admiration of everyone.

SPRING EXHIBITION.

MARCH 24, 25, 26, AND 27.

During this exhibition the weather was extremely cold, which deterred the orchid growers, whose displays have added so much to these occasions in the past, from bringing in their plants, and the

absence of Cinerarias was also noticeable. Yet, with all these drawbacks, the show was pronounced to be the finest yet given by the Society at this time of the year. First and best were the Cyclamens, of which there were nearly two hundred pots shown. Mrs. Benjamin P. Cheney (John Barr, gardener) had about seventy-five plants, on several of which were blooms measuring five inches from tip to tip; this lot was awarded the first prize. A close competitor was Nathaniel T. Kidder (William J. Martin, gardener), who was awarded the second prize. Undoubtedly a great attraction was Jackson Dawson's Crimson Rambler Rose; to describe the beauty of this plant, with its thousands of brilliant flowers, would be almost impossible; some of the trusses carried as many as forty flowers and buds. Your Committee deemed this a great acquisition, and awarded Mr. Dawson the Society Silver Medal.

MAY EXHIBITION.

May 2.

This brought a fine display of Calceolarias, Mrs. Benjamin P. Cheney staging twenty-six plants, all well flowered. Elisha S. Converse's plants showed quite a novel range of color; the individual blooms were of enormous size, and the foliage was very fine. Nathaniel T. Kidder had on exhibition a plant of *Bougainvillæa Sanderiana* fully six feet through, for which a Silver Medal was awarded. A fine specimen of *Boronia elatior*, fully six feet high, from the conservatories of Dr. C. G. Weld (Kenneth Finlayson, gardener), attracted a great deal of attention.

ROSE AND STRAWBERRY EXHIBITION.

June 23 and 24.

This brought a magnificent display of Orchids from the conservatories of E. V. R. Thayer (E. O. Orpet, gardener). Seldom do we see such well grown and well flowered Cattleyas and Odontoglossums. John L. Gardner (W. Thatcher, gardener) was represented by a fine group, and also W. P. Winsor (P. Murray, gardener), a new contributor. Nathaniel T. Kidder also exhibited a plant of *Schomburgkia tibicinis*, the gay-colored flowers of which attracted much attention.

August 15 we had from the Botanic Garden of Harvard University (Robert Cameron, gardener) a new greenhouse plant, *Angelonia angustifolia*, from seed gathered in New Mexico; the flowers are a light violet blue, and are borne in the axils of the leaves, the plants being small. Your Committee thought that another season and further development would enable them to judge better of its value. For the present they give it Honorable Mention.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 2 AND 3.

At this exhibition J. W. Manning made an exhibit of Hardy Coniferous Trees, among them being some new and rare varieties, which made quite an attractive display at the entrance to the halls; George A. Nickerson and Jason S. Bailey exhibited fine collections of greenhouse plants, which showed what good care and a thorough knowledge can do; their displays were, in the opinion of your Committee, among the best ever made.

September 19 J. W. Manning exhibited some plants of the new *Caryopteris Mastacanthus* (Blue Spiræa); it is perfectly hardy; flowers blue, borne in clusters at the axils of the leaves, making a hardy shrub which must be a great acquisition; it was awarded the Society's Silver Medal.

CHRYSANTHEMUM EXHIBITION.

NOVEMBER 10, 11, 12, AND 13.

November 10 ushered in the Chrysanthemum Exhibition, which was without doubt the finest ever staged in America; the average high quality of the exhibit was remarkable. The three principal exhibitors for the twelves were: Nathaniel T. Kidder (William J. Martin, gardener), Walter Hunnewell (T. D. Hatfield, gardener), and Mrs. Benjamin P. Cheney (John Barr, gardener). They took prizes in the order named. Mr. Kidder's excelled in general effect; his plants were very even, and the foliage was excellent. Mr. Hunnewell's were not so regular; but two of them, W. H. Lincoln and Garza, were certainly the two finest specimens that ever entered the hall. Mrs. Cheney's plants were perfect

models, regular and dwarf, but suffered in general effect. The groups in the centre of the hall, arranged for general effect with palms and foliage plants, gave the competitors a chance to show their taste and skill in the arrangement, and quite put your Committee on their mettle before they could come to a decision.

Amount appropriated for 1896		$2,000 00
Amount awarded in Prizes and Gratuities	$1,921 00	
Balance unexpended	79 00	
		2,000 00

All of which is respectfully submitted.

A. C. Bowditch,
James Comley,
James Wheeler,
Committee.

PRIZES AND GRATUITIES AWARDED FOR PLANTS.

1896.

JANUARY 11.

CHINESE PRIMROSES. — Six plants, in six-inch pots, John L. Gardner, $5 00
Second, Elisha S. Converse 4 00
Third, John L. Gardner 3 00

Gratuity: —
Walter Hunnewell (T. D. Hatfield, gardener), Lachenalias . . 2 00

FEBRUARY 1.

FREESIAS. — Six pots, the second prize to the Bussey Institution . 4 00

Gratuities: —
David Nevins, Twelve Violets in ten-inch pots 5 00
Botanic Garden of Harvard University, Collection of Freesias and Strobilanthes 4 00
Walter E. Coburn, Twelve Chinese Primroses 2 00
Richard T. Lombard, Violets 1 00

FEBRUARY 8.

Gratuities: —
James Comley, Epacris 1 00
Botanic Garden of Harvard University, *Platyclinis glumacea* . . 1 00

FEBRUARY 15.

Gratuity: —
Walter Hunnewell, Impatiens, Begonias, and Coleus . . . 2 00

FEBRUARY 29.

Gratuity: —
James Comley, Cypripedium 3 00

SPRING EXHIBITION.

MARCH 24, 25, 26, AND 27.

Theodore Lyman Fund.

INDIAN AZALEAS. — Six distinct named varieties in pots, Bussey Institution 30 00
Second, James Comley 20 00

Society's Prizes.

INDIAN AZALEAS. — Four distinct varieties in not exceeding ten-inch pots, Bussey Institution 12 00
Second, Bussey Institution 10 00

Two distinct named varieties, Dr. C. G. Weld	6 00
Second, Bussey Institution	4 00
Specimen plant, named, Norton Brothers	8 00
Second, Bussey Institution	6 00
Single plant of any named variety, in not exceeding an eight-inch pot, Dr. C. G. Weld	5 00
Second, Bussey Institution	4 00
ERICAS. — Six, not less than three species, Bussey Institution	6 00
HARDY ORCHIDS. — Collection in pans or pots, forced, Bussey Institution	2 00
Second, Bussey Institution	1 00
STOVE OR GREENHOUSE PLANTS. — Specimen in bloom, other than Azalea or Orchid, Dr. C. G. Weld	8 00
Second, Elisha S. Converse	6 00
HARD-WOODED GREENHOUSE PLANTS. — Four in bloom, Dr. C. G. Weld	10 00
HYBRID PERPETUAL ROSES. — Forced, six plants in pots, not less than three distinct varieties, James Comley	5 00
Second, James Comley	4 00
FORCED HARDY HERBACEOUS PLANTS AND SHRUBS. — The second prize to the Bussey Institution	15 00
HARDY FLOWERING DECIDUOUS SHRUBS, FORCED. — Four, of four distinct species, Bussey Institution	8 00
Second, Bussey Institution	6 00
Third, Bussey Institution	4 00
HARDY FLOWERING EVERGREEN SHRUBS, FORCED. — Four, of four distinct species, Bussey Institution	8 00
HARDY PRIMROSES AND POLYANTHUSES. — Twelve plants of distinct varieties, John L. Gardner	8 00
Second, Dr. C. G. Weld	6 00
Third, David Nevins	4 00
AURICULAS. — Six, in pots, Dr. C. G. Weld	3 00
CYCLAMENS. — Ten plants in bloom, Mrs. Benjamin P. Cheney	15 00
Second, Nathaniel T. Kidder	12 00
Third, Mrs. B. P. Cheney	10 00
Fourth, Mrs. B. P. Cheney	8 00
Ten plants in bloom, in not over seven-inch pots, Mrs. Benjamin P. Cheney	8 00
Second, Mrs. Benjamin P. Cheney	6 00
Third, Nathaniel T. Kidder	4 00
Single plant in bloom, Nathaniel T. Kidder	5 00
Second, David Nevins	4 00
CINERARIAS. — Six varieties, John L. Gardner	10 00
Second, Mrs. Benjamin P. Cheney	8 00
Third, Jason S. Bailey	6 00
Fourth, Bussey Institution	4 00

Three varieties, Mrs. Benjamin P. Cheney 6 00
Second, John L. Gardner 5 00
Third, Elisha S. Converse 4 00
Single plant, John L. Gardner 4 00
Second, Mrs. Benjamin P. Cheney 3 00
Third, Elisha S. Converse 2 00

Spring Flowering Bulbs.

HYACINTHS. — Twelve distinct named varieties, in pots, one in each pot, John L. Gardner 8 00
Second, Bussey Institution 6 00
Third, Dr. C. G. Weld 4 00
Six distinct named varieties, in pots, one in each pot, Dr. C. G. Weld 5 00
Second, Elisha S. Converse 4 00
Third, Bussey Institution 3 00
Three distinct named varieties, in pots, one in each pot, Dr. C. G. Weld 3 00
Second, Elisha S. Converse 2 00
Third, Bussey Institution 1 00
Single named bulb, in pot, Miss Mary S. Walker 2 00
Second, Dr. C. G. Weld 1 00
Three pans, not to exceed twelve inches, twelve bulbs of one variety in each pan, Miss M. S. Walker 8 00
Second, Dr. C. G. Weld 6 00
Third, John L. Gardner 4 00
Two pans, not to exceed twelve inches, ten bulbs of one variety in each pan, Elisha S. Converse 6 00
Second, Bussey Institution 4 00
Third, Miss M. S. Walker 3 00
Single pan, not to exceed ten inches, ten bulbs of one variety, Bussey Institution 4 00
Second, Miss M. S. Walker 3 00
Third, Elisha S. Converse 2 00
TULIPS. — Six eight-inch pans, nine bulbs of one variety in each, Warren Ewell & Son 4 00
Three eight-inch pans, nine bulbs of one variety in each, Warren Ewell & Son 3 00
Three ten-inch pans, twelve bulbs of one variety in each, Miss M. S. Walker 5 00
Second, Warren Ewell & Son 4 00
POLYANTHUS NARCISSUS. — Four seven-inch pots, three bulbs in each, distinct varieties, Dr. C. G. Weld 6 00
JONQUILS. — Six six-inch pots or pans, the number of bulbs in each to be at the discretion of the grower, Bussey Institution . 4 00
Second, Dr. C. G. Weld 3 00
Third, Warren Ewell & Son 2 00

NARCISSUSES. — Six eight-inch pans, distinct varieties, single or double, Warren Ewell & Son 5 00
Second, Bussey Institution 4 00
Three eight-inch pans, Warren Ewell & Son 4 00
Second, Bussey Institution 3 00
LILIUM HARRISII. — Six pots, not exceeding ten inches, Elisha S. Converse 8 00
Second, Mrs. Benjamin P. Cheney 6 00
LILY OF THE VALLEY. — Six six-inch pots, Bussey Institution . 4 00
Second, Warren Ewell & Son 3 00
Third, Warren Ewell & Son 2 00
ANEMONES. — Three pots or pans, Bussey Institution . . . 4 00
FREESIAS. — Six pots or pans, Bussey Institution 4 00
Second, Dr. C. G. Weld 3 00
Third, John L. Gardner 2 00
IXIAS AND TRITONIAS. — Six pots or pans, in varieties, Dr. C. G. Weld 4 00
Second, Dr. C. G. Weld 3 00
ROMAN HYACINTHS. — Six eight-inch pans, ten bulbs in each, Warren Ewell & Son 4 00
GENERAL DISPLAY OF SPRING BULBS. — All classes, Bussey Institution 15 00
Warren Ewell & Son 12 00

Gratuities: —
H. H. Rogers, Cyclamen and Cinerarias 7 00
Dr. C. G. Weld, *Acacia pubescens* 6 00
Edward Butler, Dendrobium 5 00
Mrs. Benjamin P. Cheney, Display of Cyclamens 5 00
James Comley, Forced Roses 5 00
David Nevins, Display of Violets 4 00
Dr. C. G. Weld, Display 5 00
James Comley, Display 5 00

APRIL 11.

Gratuities: —
James Comley, Display of Azaleas 5 00
Edward Butler, " " Orchids 4 00

APRIL 18.

Gratuity: —
Fred W. Fletcher, *Justicia carnea* 1 00

APRIL 25.

Gratuity: —
James Comley, Seedling Azalea 2 00

MAY EXHIBITION.

May 2.

Pelargoniums. — Six named Show or Fancy varieties, in not less than eight-inch pots, in bloom, Nathaniel T. Kidder	6 00
Indian Azaleas. — Six plants, in pots, named, Dr. C. G. Weld	15 00
Second, Dr. C. G. Weld	12 00
Single specimen, Dr. C. G. Weld	5 00
Second, James Comley	4 00
Calceolarias. — Six varieties, in pots, Mrs. Benjamin P. Cheney	8 00
Second, Elisha S. Converse	7 00
Third, Mrs. Benjamin P. Cheney	5 00
Fourth, Mrs. Benjamin P. Cheney	4 00
Single plant, Mrs. Benjamin P. Cheney	3 00
Second, Mrs. Benjamin P. Cheney	2 00
Streptocarpus. — Six pots, Dr. C. G. Weld	3 00
Second, Dr. C. G. Weld	2 00
Gratuities: —	
Dr. C. G. Weld, Display of *Boronia elatior*	5 00
Dr. C. G. Weld, Display	3 00

June 4.

Gratuities: —	
John L. Gardner, Collection of Orchids	10 00
Oakes Ames, *Dendrobium thyrsiflorum*	2 00

ROSE AND STRAWBERRY SHOW.

June 23 and 24.

Hard-wooded Greenhouse Plants. — Three, of three distinct named varieties, in bloom, John L. Gardner	8 00
Orchids. — Six plants, of six named varieties, in bloom, E. V. R. Thayer	25 00
Second, John L. Gardner	15 00
Three plants, of three named varieties, in bloom, John L. Gardner	15 00
Second, E. V. R. Thayer	10 00
Single specimen, named, E. V. R. Thayer	8 00
Second, John L. Gardner	6 00
Tuberous Begonias. — Six pots, of six varieties, Dr. C. G. Weld,	6 00
Gratuities: —	
W. P. Winsor, Collection of Orchids	10 00
Norton Brothers, Palms	2 00

JULY 18.

ACHIMENES. — Six, in not over eight-inch pans or pots, of six varieties, Dr. C. G. Weld 5 00

AUGUST 1.

Gratuity : —

Bussey Institution, Display of Hydrangeas 8 00

AUGUST 8.

Gratuities : —

James E. Rothwell, Display of Orchids 4 00

Mrs. P. D. Richards, Plants 2 00

ANNUAL EXHIBITION.

SEPTEMBER 2 AND 3.

HARDY CONIFEROUS TREES. — Not Natives of New England, Display in pots and tubs, named, J. W. Manning 25 00

PALMS. — Pair, in pots or tubs not more than twenty-four inches in diameter, Dr. C. G. Weld 12 00

Second, J. W. Howard 8 00

Pair, in pots not more than fourteen inches in diameter, John L. Gardner 8 00

Second, J. W. Howard 6 00

GREENHOUSE PLANTS. — Collection, containing Foliage Plants of all descriptions, not to exceed forty plants, in pots or tubs, George A. Nickerson 40 00

Second, Jason S. Bailey 30 00

Six Greenhouse or Stove Plants, of different named varieties, two Crotons admissible, Nathaniel T. Kidder 25 00

Second, John L. Gardner 20 00

Third, Dr. C. G. Weld 15 00

Single plant for table decoration, in a twelve-inch pan or basket, dressed at the base with living plants only, only one entry admissible, George A. Nickerson 8 00

Second, Elisha S. Converse 6 00

Third, John Jeffries 4 00

SPECIMEN FLOWERING PLANT. — Single named variety, Joseph H. White 8 00

Second, Joseph H. White 6 00

FUCHSIAS. — Six, in not over ten-inch pots, Joseph H. White . . 12 00

Second, Nathaniel T. Kidder 10 00

ORNAMENTAL LEAVED PLANTS. — Six named varieties, Crotons and Dracænas not admissible, Dr. C. G. Weld 15 00

Second, Joseph H. White 12 00

Third, John L. Gardner 10 00

Single specimen, variegated, named, not offered in any collection, George A. Nickerson	5 00
Second, Nathaniel T. Kidder	4 00
Third, Joseph H. White	3 00
CALADIUMS. — Six named varieties, Dr. C. G. Weld	6 00
Second, Nathaniel T. Kidder	4 00
FERNS. — Six named varieties, no Adiantums admissible, Joseph H. White	10 00
Second, Dr. C. G. Weld	8 00
Specimen, other than Tree Fern, Elisha S. Converse	4 00
Second, George A. Nickerson	3 00
TREE FERN. — Single specimen, named, not less than six feet in height, George A. Nickerson	10 00
Second, John L. Gardner	8 00
ADIANTUMS. — Five named varieties, George A. Nickerson	8 00
Second, Joseph H. White	5 00
LYCOPODS. — Four named varieties, Nathaniel T. Kidder	5 00
Second, Dr. C. G. Weld	4 00
DRACÆNAS. — Six named varieties, George A. Nickerson	8 00
Second, Dr. C. G. Weld	6 00
CROTONS. — Six, named, in not less than eight-inch pots, Dr. C. G. Weld	10 00
Second, Dr. C. G. Weld	8 00
CYCAD. — Single plant, named, J. W. Howard	10 00
Second, Elisha S. Converse	8 00
ORCHIDS. — Three plants, named varieties, in bloom, the second prize to James E. Rothwell	8 00
BEGONIA REX. — Six pots, of six varieties, James L. Little	6 00
Second, James L. Little	4 00
TUBEROUS BEGONIAS. — Six pots, of six varieties, James L. Little	6 00
Second, James L. Little	4 00
OUVIRANDRA FENESTRALIS. — E. S. Converse	8 00

Gratuities: —

John Jeffries, Collection of Ferns	8 00
J. W. Howard, Collection of Palms	5 00
Jason S. Bailey, *Dipladenia amabilis*	5 00
Botanic Garden of Harvard University, Display	50 00
Joseph H. White, Display	10 00
John L. Gardner, "	5 00
J. W. Howard, "	3 00

OCTOBER 1.

Gratuity: —

Jason S. Bailey, Collection of Orchids	4 00

OCTOBER 31.

Gratuity: —

Oakes Ames, *Stanhopea oculata* 2 00

CHRYSANTHEMUM SHOW.

NOVEMBER 10, 11, 12, AND 13.

CHRYSANTHEMUMS. — Display of twelve named plants, any or all classes, distinct varieties, Nathaniel T. Kidder . . . 50 00
Second, Walter Hunnewell 40 00
Third, Mrs. Benjamin P. Cheney 30 00
Twelve plants of twelve different varieties, grown to one stem and bloom, in not over six-inch pots, preference being given to plants not more than three feet in height, Samuel J. Trepess, 10 00
Second, James L. Little 8 00
Third, Dr. C. G. Weld 6 00
Fourth, J. W. Howard 4 00
Red, six plants, grown as above, but all of one color and of different varieties, James L. Little 5 00
Second. Dr. C. G. Weld 4 00
Third, Donald McRea 3 00
White, Dr. C. G. Weld 5 00
Second, James L. Little 4 00
Third, Elisha S. Converse 3 00
Pink, James L. Little 5 00
Second, Dr. C. G. Weld 4 00
Third, Elisha S. Converse 3 00
Yellow, James L. Little 5 00
Second, Dr. C. G. Weld 4 00
Third, Donald McRea 3 00
Six Reflexed, distinct named varieties, Mrs. Benjamin Cheney . 20 00
Specimen Incurved, named variety, Nathaniel T. Kidder . . 6 00
Second, Nathaniel Kidder 5 00
Specimen Reflexed, named variety, Walter Hunnewell . . . 6 00
Second, C. W. Hubbard 5 00
Third, Mrs. Benjamin P. Cheney 4 00
Specimen Pompon, named variety, Mrs. Benjamin P. Cheney . 4 00
Group of plants arranged for effect, limited to one hundred and fifty square feet, preference being given to collections with palms or other foliage added, A. W. Blake 45 00
Second, Dr. C. G. Weld 40 00
Third, J. W. Howard 35 00
Fourth, Elisha S. Converse 30 00
Fifth, James Comley 25 00

Gratuities: —

Mrs. B. P. Cheney, Display of *Adiantum Farleyense* . . . 15 00
Walter Hunnewell, Display of Chrysanthemums 8 00

SOCIETY'S SILVER MEDALS.

February 1. Botanic Garden of Harvard University, *Angræcum sesquipedale*.
March 7. W. P. Winsor, *Cattleya Trianæ*, var. *alba*.
Spring Exhibition, March 24–27. Jackson Dawson, Crimson Rambler Rose.
" " " " Dr. C. G. Weld, *Acacia Drummondii*.
April 4. Nathaniel T. Kidder, *Cattleya intermedia*.
May Exhibition, May 2. Nathaniel T. Kidder, *Bougainvillæa glabra* var. *Sanderiana*.
May 23. John L. Gardner, Display of Orchids.
June 4. James Comley, New White Hydrangea.
Annual Exhibition, September 2 and 3. Jason S. Bailey, *Maranta roseo-lineata*.
" " " " George Marston Whitin, *Caladium argyrites*, *C. minus* var. *erubescens*, and *Dipladenia splendens*, var. *profusa*.
September 18. J. W. Manning, *Caryopteris Mastacanthus*.
November 28. J. E. Rothwell, *Cypripedium insigne* var. *Ernestii*.

APPLETON SILVER MEDAL.

July 11. Nathaniel T. Kidder, *Adamia versicolor*.

FIRST CLASS CERTIFICATES OF MERIT.

Spring Exhibition, March 24–27. J. F. Hess, *Streptocarpus Wendlandii*.
April 25. R. & J. Farquhar, Spiræa Anthony Waterer.
June 4. Oakes Ames, *Cypripedium Sargentianum*.
Annual Exhibition, September 2 and 3. J. W. Howard, *Asparagus Sprengeli*.
October 1. Oakes Ames, Collection of Cypripediums.

HONORABLE MENTION.

Spring Exhibition, March 24–27. J. F. Hess, *Adiantum Æthiopicum*.
Rose and Strawberry Show, June 23 and 24. W. A. Manda, South Orange, N. J., *Rosa Wichuraiana*.
" " " " " " Nathaniel T. Kidder, *Schomburgkia tibicinis*.
August 15. Botanic Garden of Harvard University, *Angelonia angustifolia*.
Chrysanthemum Show, November 10–13. Dr. C. G. Weld, *Browallia speciosa* var. *major*.

COMPLIMENTARY NOTICES.

April 25. R. & J. Farquhar, *Silene pendula* var. *Amalia*.
May 23. Ernest G. Buttrick, *Cypripedium arietinum*.
Rose and Strawberry Show, June 23 and 24. E. V. R. Thayer, *Odontoglossum crispum* var.

REPORT

OF THE

COMMITTEE ON FLOWERS,

FOR THE YEAR 1896.

By J. WOODWARD MANNING, CHAIRMAN.

The past season has been remarkable in many respects: unusual weather conditions have prevailed, and as a consequence the exhibits were affected to a greater or less extent. The result was the retarding of many flowers in the early part of the summer; while in late summer and early autumn continued rains very seriously interfered with their perfection. On the whole, however, the exhibits have been exceedingly satisfactory throughout the year, and I believe that there has been a larger number of exhibitors than heretofore. This has been particularly noticeable from having drawn very severely upon the appropriation allowed the Committee for awarding gratuities in accordance with the respective merits of the exhibits. Several of the exhibitors have made interesting displays at most of the Saturday and regular exhibitions. These displays have not only been exceedingly creditable to the exhibitors, but have greatly improved the general effect of the hall. The Committee are, however, of the opinion that there has been more negligence in the matter of naming exhibits that are shown for gratuities alone than has been the case in the past, and they have made recommendations to the Committee for Establishing Prizes which it is hoped will obviate this difficulty in the future.

Exhibitions for gratuities commenced on the 4th of January,

with a choice collection of Chinese Primroses from Walter E. Coburn, Freesias from Mrs. E. M. Gill, and Camellias and Orchids from James Comley and E. Sheppard & Son.

January 11 a very creditable display was made by several parties, and choice Carnations were exhibited. David Nevins made a very interesting display of Violets, through his gardener, Alexander McKay, and Camellias were shown in specimen blooms by James Comley.

The following Saturday W. E. Coburn displayed an unusually large and fine collection of single cut blooms of Chinese Primroses, arranged in the Society's flat dishes. These were shown with a view of emphasizing their great improvement of late years in the range of color, size of bloom, and breadth and fimbriation of petals.

At the regular exhibition, February 1, David Nevins exhibited Violets which excited unusual comment. Carnations were very fully shown, of which William C. Ward, of Queens, N. Y., exhibited two large vases of Meteor and Bridesmaid, both of which were deemed worthy of Honorable Mention by your Committee. Camellias were staged in great variety of size and color, and the display of other cut flowers was large.

At each Saturday following, until the Spring Exhibition, liberal displays were made, the principal exhibitors being Oakes Ames, James Comley, and Mrs. E. M. Gill. March 14, David Nevins showed some remarkably fine forced Hybrid Perpetual Roses, and H. H. Hunnewell some new seedling Amaryllises, which excited much admiration.

SPRING EXHIBITION.

March 24, 25, 26, and 27.

At this exhibition most of the prizes were closely competed for, the display of Roses being particularly noteworthy and drawing forth much praise from an appreciative public. A vase of American Beauty Roses from Charles V. Whitten was the centre of attraction in the hall; they were remarkable for size of flower, length of stem, excellence of foliage, and keeping quality. William H. Elliott displayed several magnificent vases of Roses, which, in the general opinion of your Committee, had

never been excelled by any exhibitor at the hall. There were no exhibitors of the Belle Siebrecht and Perle des Jardins Roses. The Carnation prizes were very freely competed for, William Nicholson being the principal exhibitor and carrying off several of the first prizes. The usual difficulty of maintaining Carnations in perfect condition for several days was encountered at this time, and as a result it was necessary for the Committee to make some changes in the final awards, where parties were negligent in the matter of renewing their exhibitions. Pansies were shown in great variety by Hon. Joseph S. Fay, and the Violet prizes were competed for by David Nevins, William C. Winter, and Harry S. Rand. Camellias were shown by Joseph H. White and James Comley. The increased number of exhibitions of Camellias was evidence of the renewed interest in this valuable class of late winter blooming plants; with a closer regard to the improvement of the fimbriated varieties it would seem that the class would regain something of its previous foothold in public estimation. James Comley displayed two pans of *Rhododendron Veitchianum*, with flowers of immaculate whiteness — large, fragrant, and of good keeping quality. This valuable winter blooming Rhododendron has been shown for several seasons past by the same exhibitor, and its great apparent value would seem to recommend it to others for cultivation. Displays of flowers were made at this time by Mrs. E. M. Gill, James Comley, and Oakes Ames.

April 4, James Comley exhibited forced Chinese Wistarias and made a large display of cut Roses. David Nevins staged Roses and Orchids.

April 11, Mrs. P. D. Richards made the first display of native plants; at this date the usual exhibits of cut flowers were made by other exhibitors.

MAY EXHIBITION.

May 2.

Tulips were not competed for at this exhibition. This, we believe, has been the case for one or two seasons back. It seems a pity that large exhibitions are not made of this valuable class of bulbs, as they could be shown to great advantage and would lend additional interest and variety to the show. Hardy Narcissuses were shown very creditably by Dr. C. G. Weld and the Bussey

Institution. Hon. Joseph S. Fay carried off all three prizes for Pansies by a most remarkable display comprising a marvellous range and combination of coloring and great size of individual blooms. Native plants were shown in great variety by Mrs. P. D. Richards, Miss Genevieve Doran, Misses Eleanor and Mollie Doran, and Oakes Ames. There was no competition with Herbaceous Plants for either of the scheduled prizes, but the Botanic Garden of Harvard University took up a large portion of one side of the hall with an extremely interesting exhibit. Messrs R. and J. Farquhar & Company made a small exhibit of flowers of the new Canna Italia, for which a Complimentary Notice was awarded by the Committee.

RHODODENDRON SHOW.

June 4 and 5.

At this show the competition for prizes was very close, the principal exhibitors being James Comley, John L. Gardner, and Samuel Trepess. There were not as many competitors as usual, mainly owing to the fact that the plants had received serious injury from the past very severe winter. The exhibits that were made were very creditable, and the general displays made by James Comley and H. H. Hunnewell occupied a large portion of the hall and attracted great attention. Azaleas were shown in great variety, and Herbaceous Pæonies were displayed by John L. Gardner and George Hollis. Clematises and Hardy Flowering Trees and Shrubs were not shown as well as usual. Herbaceous Plants were competed for, for the first time at this exhibition. Native Plants were present in large variety, and attracted much attention from the public.

The exhibition on June 13 proved to be one of the most noteworthy of the season; Herbaceous Pæonies, Oriental Poppies, and Aquilegias were the principal flowers exhibited. Herbaceous Pæonies were shown in great variety by Thomas C. Thurlow and others, and a marked improvement in the cultivation of the flowers exhibited was noticed. This proves the great interest that is being taken in Pæonies in general; the flowers showed a wonderful range of coloring, size, and perfection of bloom, and many varieties were noteworthy for their fragrance. The increased size of the exhibits has made it advisable in the opinion of the

Committee that a regular Pæony Exhibition be scheduled, with an increase in the amount of the prizes, as it would seem that Pæonies should have a merited recognition with Rhododendrons and Roses. Jackson Dawson exhibited a collection of new seedling Roses, hybrids of *Rosa multiflora*, all of which were particularly interesting; they comprised a variety of color and size of bloom, in very small double flowers arranged in dense panicles, and your Committee awarded the Society's Silver Medal for the display. Another Society's Silver Medal was awarded the same skilful cultivator for a new Hybrid Rose, a cross between *Rosa Wichuraiana* and General Jacqueminot; and Honorable Mention was given him for a new seedling Double White Rose originating from the Boston Belle.

ROSE AND STRAWBERRY EXHIBITION.

June 23 and 24.

The prizes for Roses called forth a close competition by a large number of exhibitors, and the quality of the individual blooms has never been surpassed. Hon. Joseph S. Fay was the largest exhibitor, and carried off many first prizes; the quality and variety of his flowers was an ample testimonial to the extent of his collection and the skill of his gardener, M. H. Walsh. Most of the prizes scheduled were competed for, and altogether the exhibition proved very satisfactory. Polyantha Roses, however, did not receive the attention which we hoped would be given them. At this exhibition, John Jeffries made a display of Japanese Pæonies which was particularly unique, and received the Society's Silver Medal. The display consisted of very finely formed single flowered varieties, and others with broad overlapping guard petals and a ball of numerous narrow, twisted, golden and variegated petals in the centre. At this display, also, a First Class Certificate was awarded to Hon. Joseph S. Fay for his new Rose, Lillian Nordica.

On the following Saturday, a very large exhibit of Roses was made, occupying a considerable portion of the lower hall. *Iris Kœmpferi*, *Lilium candidum*, and Hardy Carnations were very little shown at this date. In the case of *Iris Kœmpferi* it was due to the flowers not being in perfection at that time. The Botanic

Garden of Harvard University made a very large display of Hardy Herbaceous Perennials, occupying the entire right-hand side of the lower hall, and M. H. Walsh, gardener to Hon. Joseph S. Fay, displayed a new seedling Rose named "Joseph S. Fay," for which the Society awarded Honorable Mention.

Hollyhocks were so seriously injured by the past winter that no display was made on the regular prize day (July 11); indeed this flower seemed to have suffered more severely than for many previous seasons.

Native Plants continued to be a feature throughout the balance of the season, and the competition being close it was difficult for your Committee to decide awards, and we would repeat the suggestion made by the Chairman of the Flower Committee of last year, which is: That we believe it to be unjust in some respects to both Committee and Exhibitors, to ask the regular Flower Committee to judge botanical collections of Native Plants, as it would be far better in our estimation for a competent botanist or Committee of botanists to judge upon these exhibits. We are very glad to note that a skilled botanist has been added to our Committee this season, as this will largely obviate the difficulty mentioned.

July 18, Gloxinias and Tuberous Begonias were shown in variety, and the prize for Hardy Ferns was closely competed for, drawing out some very noteworthy exhibitions. On this day Hon. Joseph S. Fay made a very large display of Hollyhocks, Phloxes, Roses, and Delphiniums, and Hon. John Simpkins (James Brydon, gardener) made a remarkable exhibition of Aquatic Plants which excited great admiration. Arthur E. French exhibited at the same time a collection of Grasses and Sedges which was very interesting.

July 25, Sweet Peas were shown in great perfection, and the Botanic Garden of Harvard University made a display of Herbaceous Plants, probably the largest ever seen in the hall, for which your Committee awarded the Society's Silver Medal.

August 8 brought forth the largest display of Annuals that has been seen in the hall for many years. The Society's prizes were generously competed for, and in addition to this the Botanic Garden of Harvard University made a special display of Annuals which occupied an entire side of the hall, comprising the most remarkable variety and arranged in a most effective manner, and

for which a Society's Silver Medal was awarded. At this date Dahlias were first shown, and continued to be an interesting feature of the display until the end of their season. The new Double Rudbeckia (*R. laciniata* var. Golden Glow), a very choice new Hardy Herbaceous Perennial, growing six to seven feet high, forming a broad, sturdy bush with a great profusion of very double bright yellow flowers on long clean stems, was shown simultaneously by Rea Brothers and Jacob W. Manning, to both of whom First Class Certificates were awarded therefor. Henry A. Dreer, of Philadelphia, staged a new variety of Nelumbium, named Shiroman, of the purest white, for which a First Class Certificate was awarded; also the new Nymphæa, O'Marana, of which Honorable Mention was made. The display of Gladioli did not come up to the standard of past seasons, probably owing to conditions of the weather.

The prizes for Annual Asters were competed for on the twenty-second of August in several classes, but owing to the weather and insect depredations the display was not as large as in past seasons. L. W. Goodell made a display of Drummond Phlox which was remarkable for the variety of colors shown and the range in size and form of the flowers; also a very creditable display of Salpiglossis. A tank of foliage and flowers of the *Nelumbium luteum* was shown by J. Woodward Manning from a native locality; these attracted much attention.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

September 2 and 3.

The exhibition was particularly noteworthy for its display of Aquatics, of which John Simpkins and Oakes Ames were the principal exhibitors. Dahlias also were a prominent feature of the exhibition, and excited much rivalry among the exhibitors. Cannas were freely shown, but it was justly remarked that these are better exhibited as plants than displayed as cut flowers, from the fugaciousness of their petalage. Oakes Ames (Carl Blomberg, gardener) exhibited a new Nymphæa, a cross between *Nymphœa Zanzibarensis* and its variety *rosea*, named Mrs. Anna C. Ames, the flowers of which were amaranth crimson with the base of the petals shaded to pure white, for which your Committee awarded a First Class Certificate of Merit. To Miss Eliza Wellington, of East Lexington, a First Class Certificate of Merit was awarded

for superior cultivation and exhibition of *Clianthus Dampieri*, and to J. F. Huss a First Class Certificate of Merit was awarded for *Pennisetum Ruppellii*, a new annual grass resembling a miniature Eulalia, but with long, close feathery blooms, of a showy purplish tinge, being closely allied to Squirrel Grass. Honorable Mention was also granted James Comley for a new Perennial Pea, a cross between *Lathyrus latifolius* and *L. odoratus*.

October 16, Hon. John Simpkins made a display of early Chrysanthemums, and a special vase of the Chrysanthemum Mrs. Henry Robinson, for which a First Class Certificate of Merit was awarded. This white variety seems remarkable for its large flowers, purity of color, and earliness.

CHRYSANTHEMUM SHOW.

November 10, 11, 12, and 13.

The Chrysanthemum Show was a success in every sense of the word. The marvellous size and perfection of the flowers shown gave sure proof of the excellence of their culture. Competition was close, rendering the matter of judgment on the part of the Committee difficult. The principal exhibitors were Hon. John Simpkins, Joseph H. White, Charles Souther, Mrs. Benjamin P. Cheney, W. Slack, J. W. Howard, and the Waban Conservatories. In cut single blooms, Mr. Simpkins's display was marvellous, one flower being noted with a circumference of twenty-five inches. The vases of ten blooms each were shown to the greatest advantage by the Waban Conservatories. The display for effect, in the Society's large vases, was particularly interesting, and the prizes were very closely competed for. There seems to be no lack of interest shown in the culture of the Chrysanthemum, and it was the general opinion of the Committee that competition was as close as in any previous year. In the new seedlings, J. Eaton, jr., carried off the prize for the best pink variety with Quissett, and for a white variety with Nonquit. Joseph H. White received the first prize for the new silvery pink incurved variety, Li Hung Chang, and Charles Souther exhibited a very creditable new bronze colored seedling without name. A display of Violets was made by François Supiot, of Germantown, Penn., which attracted much attention, and First Class Certificates of Merit were awarded for each of the varieties

Luxonne, a very large, single, intensely fragrant, rich blue flower, and Princess des Galles, a single flower of a deeper shade of blue.

The display of Aquatics throughout the season has been unusually good, the principal exhibitor outside of the regular exhibitions being Oakes Ames (Carl Blomberg, gardener). The importance of this class of plants is manifest, and it seems advisable that a special day should be set apart for a general display of them.

The difficulty of combining a display of plants and flowers of Chrysanthemums on the same day to cover all classes, including early and late varieties, has been very apparent, more especially affecting as it does the early blooming sorts. For that reason it seems advisable that special prizes be offered for the early blooming sorts at an earlier date than the regular Chrysanthemum Show. The increased interest that has been taken by cultivators of the early blooming sorts, and the marvellous number of named varieties of such, has made it seem necessary that some action be taken in recognition of this class.

The increase in the number of displays and new varieties of plants has been such as seriously to cut into the appropriation in many instances during the year. For this reason it is deemed advisable by the Committee to insist more particularly in the future on the correct naming of each variety of flower exhibited for gratuities. This seems necessary both for the good of the Society and the enlightenment of the public, and also to enable the Committee to keep within the appropriation allowed by the Society.

The display of Herbaceous Plants for the year has been disappointing from the lack of competition. It seems that the effort of the Committee on Establishing Prizes to gain more exhibitors by decreasing the required number of vases and increasing the awards has not had the desired effect. The Flower Committee regret that this condition exists, and hope that another year may bring closer competition in this valuable class of plants. The displays of Native Plants have been ample, and at times have taxed the capacity of the space allowed them. The competition has been close, and the exhibitions have attracted much attention from the public.

The amount appropriated for the year 1896 was . .	$2,600 00
We have awarded in prizes and gratuities, including medals	2,638 00
Making a deficit of	$38 00

All of which is respectfully submitted,

J. Woodward Manning,
Michael H. Norton,
Thomas C. Thurlow,
Kenneth Finlayson,
Frederick S. Davis,
} *Committee.*

PRIZES AND GRATUITIES AWARDED FOR FLOWERS.

1896.

January 4.

Gratuities : —

James Comley, Camellias, Orchids, etc.	$4 00
W. E. Coburn, Chinese Primroses	1 00
Mrs. E. M. Gill, Freesias	1 00
E. Sheppard & Son, Dendrobiums	1 00

January 11.

Gratuities : —

David Nevins, Display of Violets	2 00
W. N. Craig, Vase of Freesia refracta	1 00
W. N. Craig, Vase of Mixed Carnations	1 00
Peter Fisher, Vase of Carnation Edith Foster	1 00
William Nicholson, Vase of Carnation White Queen	1 00
James Comley, Display of Camellias	1 00
Mrs. E. M. Gill, Display of Flowers	1 00

January 18.

Gratuities : —

Walter E. Coburn, Primroses	2 00
E. Sheppard & Son, Cinerarias and Dendrobiums	1 00

January 25.

Gratuities : —

James Comley, Display of Flowers	5 00
Oakes Ames, " " "	5 00

February 1.

Violets. — Best collection of varieties, fifty blooms of each in a bunch, David Nevins	4 00
Second, William C. Winter	3 00
Carnations. — Display of cut blooms, with foliage, not less than six varieties, in vases, William C. Ward	8 00
Second, William Nicholson	6 00
Camellias. — Display of named varieties, cut flowers with foliage, not less than twelve blooms, of not less than six varieties, James Comley	4 00
Second, James Comley	3 00

Gratuities : —

James Comley, Display of Flowers	3 00
Oakes Ames, " " "	3 00
Mrs. E. M. Gill, " " "	2 00
Peter Fisher, Display of Carnations	1 00

FEBRUARY 8.

Gratuities : —

James Comley, Camellias	3 00
E. Sheppard & Son, Orchids and Cinerarias	2 00
Oakes Ames, Display of Flowers	2 00
Bussey Institution, Forced Shrubs and Anemones	1 00

FEBRUARY 15.

Gratuity : —

James Comley, Display of Flowers	3 00

FEBRUARY 29.

Gratuities : —

James Comley, Display of Flowers	3 00
Mrs. E. M. Gill, " " "	1 00
James Comley, Display of Orchids	1 00

MARCH 7.

Gratuities : —

James Comley, Display of Flowers	4 00
Mrs. E. M. Gill, " " "	1 00

MARCH 14.

Gratuities : —

David Nevins, Hybrid Perpetual Roses	5 00
James Comley, Roses and Lilacs	3 00
H. H. Hunnewell, Amaryllises	2 00
Oakes Ames, Collection of Flowers	2 00

MARCH 21.

Gratuities : —

David Nevins, Hybrid Perpetual Roses	5 00
James Comley, Roses	2 00
Oakes Ames, Flowers	2 00

SPRING EXHIBITION.

MARCH 24, 25, 26, AND 27.

HYBRID PERPETUAL ROSES. — Twelve blooms, of not less than four distinct named varieties, David Nevins	12 00
Second, James Comley	10 00
HYBRID PERPETUAL ROSES. — Six blooms, not less than three named varieties, David Nevins	6 00
Twelve blooms of Ulrich Brunner, G. M. Anderson	10 00
Second, David Nevins	8 00

TENDER ROSES IN VASES. — Twelve blooms of American Beauty, Charles V. Whitten 15 00
Twenty-five blooms of Bridesmaid, William H. Elliott . . 12 00
Second, Charles V. Whitten 10 00
Twenty-five blooms of Meteor, the second prize to Charles V. Whitten 10 00
Twenty-five blooms of Mrs. J. Pierpont Morgan, John N. May, Summit, N. J. 12 00
Twenty-five blooms of The Bride, William H. Elliott . . . 12 00
Second, Charles V. Whitten 10 00
Twenty-five blooms of Catherine Mermet, William H. Elliott . 8 00
Second, Charles V. Whitten 6 00
Twenty-five blooms of Papa Gontier, William H. Elliott . . 8 00
Vase of fifty blooms of assorted varieties of Roses, David Nevins, 20 00
Second, Charles V. Whitten 16 00

CARNATIONS. — Twenty-five blooms of any Crimson variety, William Nicholson for Ferdinand Mangold 3 00
Twenty-five blooms of any Dark Pink variety (William Scott or darker), William Nicholson for Nickerson 3 00
Second, William Nicholson for William Scott 2 00
Twenty-five blooms of any Light Pink variety (lighter than William Scott), William H. Elliott for Albertina 3 00
Twenty-five blooms of any Scarlet variety, William Nicholson for Hector 3 00
Twenty-five blooms of any White variety, William Nicholson for Crystal 3 00
Twenty-five blooms of any Yellow variety, William Nicholson for Eldorado 3 00

PANSIES. — Forty-eight cut blooms, not less than twenty-four varieties, in the Society's flat fruit dishes, Hon. Joseph S. Fay 4 00

VIOLETS. — Bunch of fifty blooms of Czar, Harry S. Rand . . 2 00
Bunch of fifty blooms of Lady Hume Campbell, David Nevins . 2 00
Second, William C. Winter 1 00
Bunch of fifty blooms of Marie Louise, David Nevins . . . 2 00
Second, Harry S. Rand 1 00
Bunch of fifty blooms of any other variety, David Nevins for Swanley White 2 00

CAMELLIAS. — Display of named varieties, cut flowers with foliage, not less than twenty-four blooms, of not less than six varieties, Joseph H. White 4 00
Second, James Comley 3 00

Gratuities: —

David Nevins, Roses and Orchids 15 00
James Comley, Display of Roses, Orchids, etc. 15 00
Oakes Ames, " " " 5 00

James Comley, *Rhododendron Veitchianum* 2 00
Harry S. Rand, Collection of Violets 2 00
George M. Anderson, Vase of Catherine Mermet Roses . . . 1 00
Jason S. Bailey, Spike of *Dendrobium thyrsiflorum* . . . 1 00
Mrs. E. M. Gill, Display of Flowers 1 00

APRIL 4.

Gratuities : —
David Nevins, Display of Roses and Orchids 5 00
James Comley, Display of Roses 5 00
James Comley, Display of Wistarias 2 00

APRIL 11.

Gratuities : —
Charles V. Whitten, Two Vases of Roses 3 00
Hon. Joseph S. Fay, Display of Pansies 2 00
James Comley, Display of Orchids 2 00
James Comley, Display of Flowers 4 00
Oakes Ames, " " " 2 00
Mrs. E. M. Gill, " " " 2 00
Mrs. P. D. Richards, Native Flowers 1 00

APRIL 18.

Gratuities : —
Hon. Joseph S. Fay, Display of Pansies 2 00
Mrs. E. M. Gill, Flowers 1 00
Mrs. P. D. Richards, Native Plants 1 00

APRIL 25.

Gratuity : —
James Comley, Display of Flowers 2 00

MAY EXHIBITION.

MAY 2.

HARDY NARCISSUSES. — Collection of not less than ten named varieties of blooms, in vases, Dr. C. G. Weld 5 00
Second, Bussey Institution 4 00
PANSIES. — Forty-eight blooms, not less than twenty-four varieties, in the Society's flat fruit dishes, Hon. Joseph S. Fay . . 4 00
Second, Hon. Joseph S. Fay 3 00
Third, Hon. Joseph S. Fay 2 00
NATIVE PLANTS. — Mrs. P. D. Richards 8 00
Second, Genevieve Doran 6 00
Third, Oakes Ames 4 00

Gratuities : —

Hon. Joseph S. Fay, Display of Pansies	8 00
Botanic Garden of Harvard University, Herbaceous Plants	6 00
Charles V. Whitten, Tulips	3 00
Charles V. Whitten, Vase of Roses	2 00
William Nicholson, Vase of Carnations	1 00
James Comley, Flowers	3 00
Oakes Ames, "	3 00
Mrs. E. M. Gill, "	1 00

MAY 9.

Gratuities : —

Hon. Joseph S. Fay, Pansies	2 00
Oakes Ames, Flowers	4 00
Mrs. P. D. Richards, Native Flowers	3 00

MAY 16.

Gratuities : —

Rea Brothers, Tulips	2 00
James Comley, Flowers	5 00
Mrs. E. M. Gill, "	1 00
Mrs. P. D. Richards, Native Plants	2 00

MAY 28.

Gratuities : —

Oakes Ames, Roses	2 00
James Comley, Flowers	5 00
Mrs. E. M. Gill, "	1 00
Misses Eleanor and Mollie Doran, Native Flowers	1 00
Mrs. P. D. Richards, " "	1 00
Alice L. Grinnell, " "	1 00

RHODODENDRON SHOW.

JUNE 4 AND 5.

H. H. Hunnewell Fund.

RHODODENDRONS. — Twelve distinct varieties, of unquestionable hardiness, named, James Comley, a piece of plate valued at	20 00
Second, Samuel Trepess, a piece of plate valued at	15 00
Six distinct varieties, of unquestionable hardiness, named, John L. Gardner	10 00
Second, James Comley	5 00
Six tender varieties, named, James Comley	5 00
Three tender varieties, named, James Comley	4 00

Hardy Azaleas. — From any or all classes, fifteen varieties, one vase of each, James Comley	8 00
Twelve varieties, one vase of each, James Comley	4 00
Six varieties, one vase of each, John L. Gardner	3 00
Cluster of Trusses of one variety, Oakes Ames	2 00
Second, John L. Gardner	1 00
Herbaceous Pæonies. — Collection of named varieties, John L. Gardner	6 00
Second, George Hollis	4 00
German Irises. — Six distinct varieties, three spikes of each, John L. Gardner	3 00
Second, Walter H. Cowing	2 00
Hardy Pyrethrums. — Display, Kenneth Finlayson	4 00
Second, Charles V. Whitten	3 00
Herbaceous Plants. — Reading Nursery	8 00
Second, Rea Brothers	6 00
Native Plants. — Collection not exceeding thirty bottles of named species and varieties, one bottle of each, Mrs. P. D. Richards,	8 00
Second, Oakes Ames	6 00
Third, Misses Eleanor and Mollie Doran	4 00
Vase of Flowers. — Mrs. A. D. Wood	4 00
Second, Mrs. E. M. Gill	3 00

Gratuities: —

H. H. Hunnewell, Rhododendrons	30 00
James Comley, "	25 00
Mrs. Benjamin P. Cheney, Rhododendrons and Azaleas	15 00
John L. Gardner, Rhododendrons, etc.	7 00
Hon. Joseph S. Fay, Cut Shrubs and Flowers	6 00
James Comley, Hardy Trees and Shrubs	5 00
Oakes Ames, Aquatics	6 00
Walter H. Cowing, German Irises	2 00
Walter H. Cowing, Oriental Poppies	2 00
Hon. Joseph S. Fay, Pansies	2 00
Frederick S. Davis, Aquilegias	2 00
Mrs. E. M. Gill, Flowers	2 00
Leverett M. Chase, Flowers	1 00
James Comley, Orchids	1 00

June 13.

Herbaceous Pæonies. — Collection of named varieties, Thomas C. Thurlow	10 00
Second, Dr. C. G. Weld	8 00
Third, George Hollis	6 00
Oriental Poppies. — Collection, named, Walter H. Cowing	3 00

AQUILEGIAS. — Collection, named, Frederick S. Davis	3 00
Second, F. A. Blake	2 00
Third, Walter H. Cowing	1 00
FOXGLOVES. — Twelve spikes, Walter H. Cowing	2 00

Gratuities: —

James Comley, Rhododendrons, Roses, etc.	15 00
Oakes Ames, Display of Aquatics and Flowers	10 00
Hon. Joseph S. Fay, Roses	10 00
Hon. Joseph S. Fay, Display of Pæonies	5 00
James Comley, Hardy Shrubs	5 00
Hon. Joseph S. Fay, Pæonies	3 00
Oakes Ames, Water Lilies	3 00
Hon. Joseph S. Fay, Collection of Hardy Trees and Shrubs	2 00
Hon. Joseph S. Fay, Roses	2 00
Walter H. Cowing, Spanish Irises	2 00
George Hollis, Display of Seedling Pæonies	2 00
O. B. Hadwen, Display of Pæonies	1 00
Rea Brothers, Display of Perennials	1 00
Mrs. E. M. Gill, Display of Flowers	3 00
Mrs. P. D. Richards, Native Flowers	1 00

ROSE EXHIBITION.

JUNE 23 AND 24.

Special Prize Theodore Lyman Fund.

HARDY ROSES. — Twenty-four distinct named varieties, three of each variety, Hon. Joseph S. Fay, in money or plate of equal value	25 00
Second, Mrs. J. W. Clark, Pomfret, Conn., in money or plate of equal value	20 00

Special Prizes offered by the Society.

Six blooms of Alfred Colomb, the second prize to Hon. Joseph S. Fay	2 00
Six blooms of Baroness Rothschild, Hon. Joseph S. Fay	3 00
Second, Dr. C. G. Weld	2 00
Six blooms of John Hopper, Hon. Joseph S. Fay	3 00
Six blooms of Marquise de Castellane, Hon. Joseph S. Fay	3 00
Six blooms of Merveille de Lyon, Hon. Joseph S. Fay	3 00
Second, Dr. C. G. Weld	2 00
Six blooms of Mme. Gabriel de Luizet, Hon. Joseph S. Fay	3 00
Second, Dr. C. G. Weld	2 00
Six blooms of Mme. Victor Verdier, Hon. Joseph S. Fay	3 00
Second, Dr. C. G. Weld	2 00

Six blooms of Prince Camille de Rohan, Mrs. J. W. Clark . . 3 00
Second, Hon. Joseph S. Fay 2 00
Twelve blooms of any other variety, Hon. Joseph S. Fay, for Duke of Edinburg 4 00
Second, Mrs. J. W. Clark, for Magna Charta 3 00

Regular Prizes.

Sixteen distinct named varieties, three of each variety, Hon. Joseph S. Fay 15 00
Second, Mrs. J. W. Clark 10 00
Twelve distinct named varieties, three of each, Hon. Joseph S. Fay, 10 00
Second, Dr. C. G. Weld 8 00
Six distinct named varieties, three of each, Hon. Joseph S. Fay . 6 00
Second, Dr. C. G. Weld 4 00
Third, Mrs. J. W. Clark 2 00
Three distinct varieties, named, three of each, Hon. Joseph S. Fay, 3 00
Twenty-four distinct named varieties, one of each, the second prize to Mrs. J. W. Clark 8 00
Third, Hon. Joseph S. Fay 6 00
Eighteen distinct named varieties, one of each, the second prize to James Comley 6 00
Third, Hon. Joseph S. Fay 4 00
Twelve distinct named varieties, one of each, Hon. Joseph S. Fay . 6 00
Six distinct named varieties, one of each, Hon. Joseph S. Fay . 4 00
Second, Dr. C. G. Weld 3 00
Third, Miss Mary S. Walker 2 00
Moss Roses. — Six distinct named varieties, three clusters of each, Dr. C. G. Weld 4 00
Third, Hon. Joseph S. Fay 2 00
Hybrid Tea Roses. — Six named varieties, buds admissible, Hon. Joseph S. Fay 3 00
General Display. — One hundred bottles of Hardy Roses, buds admissible, Hon. Joseph S. Fay 10 00
Second, Mrs. J. W. Clark 9 00
Third, James Comley 8 00
Fourth, Mrs. E. M. Gill 7 00
Fifth, Hon. Joseph S. Fay 6 00
Basket of Roses. — Arranged for effect, to be shown the second day, James Comley 5 00
Second, Mrs. E. M. Gill 3 00
Sweet Williams. — Thirty spikes, not less than six distinct varieties, Samuel Trepess 4 00
Second, Walter H. Cowing 3 00
Third, Oakes Ames 2 00
Fourth, Walter E. Coburn 1 00

VASE OF FLOWERS. — Best arranged, in one of the Society's glass vases, Mrs. A. D. Wood 5 00
Second, Mrs. E. M. Gill 4 00

Gratuities: —

Hon. Joseph S. Fay, Display of Roses 25 00
Hon. Joseph S. Fay, " " " 8 00
Hon. Joseph S. Fay, " " " 5 00
Hon. Joseph S. Fay, Bank of Roses 3 00
Hon. Joseph S. Fay, Display of Mad. Gabriel de Luizet Roses . 6 00
J. Eaton, jr., Roses 10 00
James Comley, " 10 00
James Comley, " 3 00
James Comley, Stand of Roses 3 00
Dr. C. G. Weld, Roses 8 00
Mrs. J. W. Clark, " 5 00
Patrick Kane, " 4 00
Mrs. E. A. Wilkie, Three Vases of Roses 3 00
William H. Spooner, Display of Roses 3 00
Jackson Dawson, " " " 2 00
Mrs. E. M. Gill, " " " 1 00
L. W. Goodell, Aquatics 10 00
Oakes Ames, " 8 00
Dr. C. G. Weld, Display of Sweet Williams and Roses 4 00
Walter E. Coburn, Pelargoniums 3 00
Rea Brothers, Hardy Perennials 3 00
Walter H. Cowing, English Irises 3 00
Walter E. Coburn, Stand of Sweet Williams 2 00
A. F. Estabrooks, Pæonies 1 00
O. B. Hadwen, " 1 00
Edwin Sheppard, Sweet Williams 1 00
Samuel J. Trepess, Foxgloves 1 00
Oakes Ames, Display of Flowers 10 00
James Comley, Flowers 3 00
Mrs. P. D. Richards, Native Flowers 2 00

JUNE 27.

HARDY ROSES. — Collection, named, not less than twenty-five varieties, filling fifty vases, one rose in each vase, Hon. Joseph S. Fay 15 00
Second, Hon. Joseph S. Fay 10 00
Third, James Comley 6 00
Fourth, Hon. Joseph S. Fay 4 00
IRIS KÆMPFERI. — Six varieties, three of each, in vases, John L. Gardner 4 00
ENGLISH IRISES. — Best collection, Walter H. Cowing 3 00

Delphiniums. — Collection of twenty spikes, not less than five varieties, Dr. C. G. Weld	5 00
Third, Oakes Ames	3 00
Campanula Medium. — Collection, not less than twelve bottles, Dr. C. G. Weld	3 00
Herbaceous Plants. — Thirty bottles, Reading Nursery	8 00
Third, Rea Brothers	4 00
Vase of Flowers. — Mrs. E. M. Gill	4 00
Second, Mrs. A. D. Wood	3 00

Gratuities : —

Hon. Joseph S. Fay, Display of Roses	15 00
James Comley, " " "	10 00
Oakes Ames, " " "	2 00
Patrick Kane, " " "	2 00
Mrs. E. M. Gill, Roses	2 00
William H. Spooner, Display of Roses	1 00
Botanic Garden of Harvard University, Hardy Herbaceous Perennials	12 00
Oakes Ames, Display of Aquatics	5 00
Walter E. Coburn, Pelargoniums and Sweet Peas	3 00
Bussey Institution, Lilies and Delphiniums	2 00
Dr. C. G. Weld, Sweet Williams	1 00
Mrs. E. M. Gill, Flowers	1 00
Mrs. P. D. Richards, Wild Flowers	2 00

July 11.

Native Plants. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each, Mrs. P. D. Richards,	8 00
Second, Genevieve Doran	6 00
Third, Oakes Ames	4 00
Vase of Flowers. — Best arranged, in one of the Society's glass vases, James Comley	4 00
Second, Mrs. A. D. Wood	3 00

Gratuities : —

Oakes Ames, Display of Aquatics	5 00
Reading Nursery, Hardy Flowers	3 00
Rea Brothers, Hardy Perennials	2 00
Walter H. Cowing, Shirley Poppies	2 00
John Jeffries, Nasturtiums and Japanese Irises	1 00
Hattie B. Winter, Vase of Flowers	1 00
James Comley, Display of Flowers	5 00
Mrs. E. M. Gill, " " "	1 00

JULY 18.

GLOXINIAS. — Twelve vases, cut blooms, three in each vase, arranged with any foliage, Jason S. Bailey	5 00
Second, Dr. C. G. Weld	4 00
Third, James L. Little	3 00
TUBEROUS BEGONIAS. — Twelve vases, three in each vase, arranged with any foliage, Dr. C. G. Weld	4 00
Second, Elisha S. Converse	3 00
HARDY FERNS. — Display of named species and varieties, Oakes Ames	7 00
Second, Mrs. P. D. Richards	5 00
Third, Mrs. Mary E. Loud	3 00

Gratuities: —

Hon. Joseph S. Fay, Hollyhocks, Phloxes, Roses, Larkspurs, etc.	20 00
Hon. John Simpkins, Display of Aquatics	20 00
Oakes Ames, " " "	4 00
Oakes Ames, Roses, Japanese Irises, etc.	3 00
John Jeffries, Antirrhinums	2 00
Rea Brothers, Hardy Plants	2 00
Dr. C. G. Weld, Gloxinias	2 00
Dr. C. G. Weld, Begonias	2 00
Sumner Coolidge, Hardy Carnations	1 00
James Comley, Display of Flowers	8 00
Mrs. E. M. Gill, Flowers	3 00
Arthur E. French, Collection of Sedges and Grasses	3 00

JULY 25.

SWEET PEAS. — Display, filling thirty vases, arranged with any foliage, H. A. Jones	6 00
Second, E. A. Weeks	4 00
Third, Samuel J. Trepess	3 00
Display of named varieties, in vases, six sprays in each vase, H. A. Jones	4 00
Second, E. A. Weeks	3 00
Third, F. A. Blake	2 00
VASE OF FLOWERS. — For table decoration, James Comley	4 00
Second, Hattie B. Winter	3 00

Gratuities: —

Oakes Ames, Display of Aquatics	10 00
James Comley, Display of Flowers	5 00
Mrs. E. M. Gill, " " "	2 00
John Jeffries, " " "	1 00
Mrs. P. D. Richards, Display of Native Plants	1 00

August 1.

Perennial Phloxes. — Ten distinct named varieties, one spike of each, the second prize to John L. Gardner	4 00
Third, George Hollis	3 00
Native Flowers. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each, Mrs. P. D. Richards,	8 00
Second, Miss Genevieve Doran	6 00
Third, Oakes Ames	4 00
Gratuities: —	
Oakes Ames, Aquatics	5 00
Bussey Institution, Montbretias, Sweet Peas, etc.	3 00
Jason S. Bailey, Orchids and Roses	2 00
George Hollis, Display of Phloxes	2 00
E. Sheppard, Phloxes and Zinnias	1 00
John L. Gardner, Phloxes and Gladioli	1 00
A. Lummus, Dahlias	1 00
Arthur F. Coolidge, Verbenas and other Flowers	1 00
Rea Brothers, Hardy Herbaceous Perennials	1 00
James Comley, Display of Flowers	4 00
James Comley, Vase of Flowers	2 00
Mrs. A. D. Wood, Flowers	2 00
Mrs. E. M. Gill, "	1 00
Mrs. E. M. Gill, Vase of Wild Flowers	1 00

August 8.

Annuals. — General display, named, filling not less than one hundred and fifty bottles, Oakes Ames	10 00
Second, Mrs. E. M. Gill	8 00
Third, Miss A. D. Coolidge	6 00
Gratuities: —	
Joseph H. White, Collection of Sweet Peas	3 00
Rev. W. T. Hutchins, Sweet Peas	3 00
Bussey Institution, Sweet Peas, Gladioli, and Montbretias	3 00
J. Warren Clark, Seedling Gladioli	3 00
Botanic Garden of Harvard University, Collection of Hardy Phloxes,	2 00
George Hollis, Cannas and Phloxes	1 00
Rea Brothers, Hardy Perennials	1 00
A. Lummus, Dahlias	1 00
James Comley, Display of Flowers	4 00
William C. Winter, Flowers	1 00

August 15.

Gladioli. — Twenty named varieties, in spikes, J. Warren Clark	6 00
Ten named varieties, in spikes, John Parker	3 00
Second, J. Warren Clark	2 00

Six named varieties, in spikes, J. Warren Clark	2 00
Second, Walter H. Cowing	1 00
Display of named and unnamed varieties, filling one hundred vases, arranged for effect with any foliage, J. Warren Clark	8 00

Gratuities: —

John Jeffries, Drummond Phlox	2 00
Walter H. Cowing, Display of Cannas	2 00
F. A. Blake, Salpiglossis	1 00
F. A. Blake, Petunias	1 00
William E. Endicott, Dahlias	1 00
A. Lummus, "	1 00
James Comley, Display of Flowers	5 00
Oakes Ames, " " "	4 00
Bussey Institution, " " "	3 00
Mrs. E. M. Gill, Flowers	2 00
Alice L. Grinnell, Native Plants	1 00
Mrs. P. D. Richards, " "	1 00

AUGUST 22.

ASTERS. — Large Flowered, of all classes, fifty vases, not less than twelve varieties, three flowers in each vase, James Comley	4 00
Second, F. A. Blake	3 00
Third, Sumner Coolidge	2 00
Victoria Flowered, thirty blooms, not less than twelve varieties, Charles H. Souther	3 00
Second, Elisha S. Converse	2 00

Gratuities: —

Botanic Garden of Harvard University, Herbaceous Plants	8 00
J. Woodward Manning, *Nelumbium luteum*	3 00
A. Lummus, Dahlias	2 00
L. W. Goodell, Drummond Phlox	2 00
L. W. Goodell, Salpiglossis	2 00
Mrs. H. J. Stockford, Begonias and Sweet Peas	1 00
Edwin Sheppard, China Asters	1 00
John Parker, Gladioli, etc.	1 00
Bussey Institution, Flowers	1 00
James Comley, "	2 00
George Hollis, "	1 00
Mrs. E. M. Gill, "	1 00
Mrs. P. D. Richards, Native Plants	1 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 2 AND 3.

Special Prize, Theodore Lyman Fund.

AQUATIC PLANTS. — General Display of Nymphæas, Nelumbiums, and other Aquatic Plants, to include not less than twenty-five blooms of Nymphæas, Hon. John Simpkins 50 00
Display of twelve Nymphæas and Nelumbiums, the second prize to Oakes Ames 8 00

Regular Prizes.

DAHLIAS. — Double, twelve blooms, distinct named varieties, H. F. Burt 5 00
Second, John Parker 4 00
Third, Lothrop & Higgins 3 00
Six blooms, distinct named varieties, H. F. Burt 3 00
Second, Lothrop & Higgins 2 00
Third, L. W. Snow 1 00
Specimen bloom, Lothrop & Higgins 2 00
Second, L. W. Snow 1 00
Liliputian Dahlias, Display of twenty-five bottles, not less than eight named varieties, L. W. Snow 4 00
Second, William C. Winter 3 00
Third, A. Lummus 2 00
Single Dahlias, Display of not less than eight varieties, William E. Endicott 2 00
Cactus Dahlias, Display filling eighteen bottles, not less than six varieties, H. F. Burt 5 00
Second, William E. Endicott 4 00
LILIUM LANCIFOLIUM. — Collection of named varieties, Sumner Coolidge 4 00
TROPÆOLUMS. — Display, with their own foliage, filling twenty-five vases, Dr. C. G. Weld 4 00
Second, Miss A. L. Cain 3 00
Third, James Comley 2 00
MARIGOLDS. — Display of French and African, filling twenty-five vases, James Comley 3 00
Second, Charles H. Souther 2 00
CANNAS. — Collection of not less than ten named varieties, in spikes, with foliage, James L. Little 10 00
Second, Walter H. Cowing 8 00
Third, James Farquhar 6 00
Fourth, Christian Johnson 4 00

DOUBLE ZINNIAS. — Twenty-five flowers, not less than six varieties,
James Comley 4 00
Second, Frederick S. Davis 3 00
Third, Oakes Ames 2 00
DIANTHUSES. — Collection not exceeding forty bottles, of named species and varieties, one bottle of each, L. W. Goodell . 3 00
NATIVE PLANTS. — Collection not exceeding forty bottles, of named species and varieties, one bottle of each, Mrs. P. D. Richards, 8 00
Second, Miss Genevieve Doran 6 00
Third, Misses Eleanor and Mollie Doran 4 00
VASE OF FLOWERS. — For table decoration, on the last day of the exhibition, Hattie B. Winter 4 00

Gratuities: —

Oakes Ames, Collection of Aquatic Plants 12 00
Henry A. Dreer, Philadelphia, Penn., Collection of Aquatic Plants, 12 00
L. W. Goodell, Collection of Aquatic Plants 12 00
W. W. Rawson, Display of Dahlias 10 00
William C. Winter, Collection of Dahlias 2 00
T. C. Thurlow, Forty-three named varieties of Phlox . . . 5 00
James Comley, Pyramid of Asters 4 00
L. W. Goodell, Phlox, Asters, and Salpiglossis 3 00
F. A. Blake, Asters 1 00
Norris R. Comley, Cockscombs 1 00
James L. Little, *Tydæa hybrida grandiflora* 1 00
A. B. Howard, Verbenas and Pompon Zinnias 1 00
James Comley, Display of Flowers 3 00
Bussey Institution, Flowers 1 00
John Jeffries, " 1 00
Mrs. E. M. Gill, " 1 00
Mrs. J. A. Cain, " 1 00

SEPTEMBER 12.

Gratuities: —

John J. Colan, Cockscombs 2 00
John Parker, Dahlias 1 00
E. Sheppard, " 1 00
Mrs. E. M. Gill, Flowers 1 00

SEPTEMBER 19.

PERENNIAL ASTERS. — Display of native or introduced species and varieties, Mrs. P. D. Richards 5 00
Third, Misses Eleanor and Mollie Doran 3 00

Gratuities: —

A. Lummus, Named Dahlias 2 00
John Jeffries, Coleus, Dahlias, etc. 2 00
J. Woodward Manning, Flowers 1 00
Mrs. E. M. Gill, " 1 00

OCTOBER 16.

Gratuity: —

Hon. John Simpkins, Display of Early Chrysanthemums . . . 6 00

OCTOBER 24.

Gratuities: —

James Comley, Chrysanthemums and Cosmos 3 00
Mrs. E. M. Gill, Chrysanthemums 1 00

OCTOBER 31.

Gratuities: —

Hon. John Simpkins, Two vases of Chrysanthemum, Mrs. Henry Robinson 5 00
James Comley, Display of Flowers 4 00
Hon. John Simpkins, New Seedling Chrysanthemum . . . 2 00

CHRYSANTHEMUM SHOW.

NOVEMBER 10, 11, 12, AND 13.

Special Prize from the Josiah Bradlee Fund.

Twenty-five blooms, of twenty-five distinct varieties, named, Hon. John Simpkins, a piece of plate, or value in money . . 20 00
Second, Mrs. Benjamin P. Cheney 15 00
Third, Joseph H. White 10 00
Six vases, of six named varieties, ten blooms of each, Waban Conservatories 30 00
Second, Mrs. Benjamin P. Cheney 25 00
Third, J. W. Howard 20 00

Special Prizes offered by the Society.

Best Seedling, never disseminated, six blooms, Pink, J. Eaton, jr. . 5 00
Best Seedling, never disseminated, six blooms, White, J. Eaton, jr., 5 00
Best Seedling, never disseminated, six blooms, any other color, Charles Souther 5 00
Best Seedling, never disseminated, six blooms Incurved, of any color, Joseph H. White, for Li Hung Chang 5 00

Regular Prizes.

Twelve blooms, Incurved, named, in vases, Joseph H. White . . 8 00
Second, John Jeffries 6 00
Twelve blooms, Japanese, named, in vases, Hon. John Simpkins . 10 00
Second, Joseph H. White 6 00
Third, William Slack 4 00

Twelve blooms, Japanese Incurved, named, in vases, John Simpkins	10 00
Second, Mrs. Benjamin P. Cheney	6 00
Third, Joseph H. White	4 00
Twelve blooms, Anemone, named, in vases, J. W. Howard	8 00
Second, James L. Little	6 00
Third, William Slack	4 00
Six blooms Incurved, named, in vases, Charles H. Souther	5 00
Second, Elisha S. Converse	4 00
Third, Joseph H. White	2 00
Six blooms, Japanese, named, in vases, Charles H. Souther	6 00
Third, Joseph H. White	2 00
Six blooms, Japanese Incurved, named, in vases, Charles H. Souther,	6 00
Second, Joseph H. White	4 00
Third, Mrs. Benjamin P. Cheney	2 00
Six blooms Reflexed, named, in vases, Joseph H. White	6 00
Second, Mrs. Benjamin P. Cheney	4 00
Third, Charles H. Souther	2 00
Six blooms, Anemone, named, in vases, Elisha S. Converse	5 00
Second, James L. Little	4 00
Third, William Slack	2 00
Twelve sprays, Pompons, not less than six named varieties, J. W. Howard	3 00
Second, William Slack	2 00
Twelve best varieties, named, introductions of the current year, Joseph H. White	8 00
Second, J. W. Howard	6 00
Vase of blooms on long stems, arranged in the Society's large china vases, to be kept in good condition during the exhibition, Hon. John Simpkins	20 00
Second, Hon. John Simpkins	18 00
Third, David Nevins	16 00
Fourth, Mrs. Benjamin P. Cheney	14 00
Fifth, Charles H. Souther	12 00
Sixth, J. W. Howard	10 00
Seventh, James Comley	8 00
Best vase of ten blooms on long stems, Pink, named, Mrs. Benjamin P. Cheney, for Viviand-Morel	10 00
Second, Mrs. Benjamin P. Cheney, for Mrs. Perin	8 00
Third, James L. Little, for Viviand-Morel	6 00
Best vase, ten blooms, on long stems, Red, named, Waban Conservatory, for Edwin Molyneux	10 00
Second, Mrs. Benjamin P. Cheney, for John Shrimpton	8 00
Third, James L. Little, for Egyptian	6 00
Best vase of ten blooms, on long stems, White, named, Waban Conservatories, for Mrs. Jerome Jones	10 00
Second, Mrs. Benjamin P. Cheney, for Mrs. W. H. Phipps	8 00
Third, James L. Little, for Mrs. Jerome Jones	6 00

Best vase of ten blooms, on long stems, Yellow, named, Waban Conservatories, for Eugene Dailledouze	10 00
Second, Mrs. Benjamin P. Cheney, for Major Bonnafon	8 00
Third, Mrs. Benjamin P. Cheney, for Eugene Dailledouze	6 00
Best vase of ten blooms, on long stems, any other color, Mrs. Benjamin P. Cheney, for Mrs. George West	10 00
Second, J. W. Howard, for Charles Davis	8 00
Third, Elisha S. Converse, for Hicks Arnold	6 00

Gratuities: —

Mrs. E. M. Gill, Chrysanthemums	7 00
William Nicholson, Chrysanthemums and Carnations	5 00
John Jeffries, Display	5 00
James Comley, Chrysanthemums	4 00
Elisha S. Converse, Chrysanthemums	3 00
Hon. John Simpkins, two vases of Chrysanthemums	3 00
Joseph H. White, Display of Chrysanthemums	3 00
Norton Brothers, *Cattleya Bowringiana*	2 00
David Nevins, Violets	1 00

NOVEMBER 21.

Gratuities: —

James Comley, Display of Flowers	8 00
Mrs. E. M. Gill, " " "	1 00

SOCIETY'S SILVER MEDALS.

June 13. Jackson Dawson: for Collection of New Seedling Roses, hybrids of *Rosa multiflora*.

" " Jackson Dawson, for New Rose, cross between *Rosa Wichuraiana* and General Jacqueminot.

Rose Show, June 23. John Jeffries, for Japanese Pæonies.

July 25. Botanic Garden of Harvard University, for Display of Herbaceous Plants.

August 8. Botanic Garden of Harvard University, for Superior Collection of Annuals.

Chrysanthemum Show, November 10. Ernest Asmus, Hoboken, N. J., for Rose Souvenir de Président Carnot.

APPLETON SILVER MEDAL.

Mrs. P. D. Richards, for Native Plants.

FIRST CLASS CERTIFICATES OF MERIT.

Rose Show, June 23. Oakes Ames, for Sweet Williams.

" " " " Hon. Joseph S. Fay, for Rose Lillian Nordica.

August 8. Rea Brothers, for *Rudbeckia laciniata* var. *Golden Glow.*
" " Jacob W. Manning, for *Rudbeckia laciniata* var. *Golden Glow.*
" " Henry A. Dreer, Philadelphia, Pa., for Nelumbium Shiroman.
" " Rev. W. T. Hutchins, for New Unnamed Sweet Pea.
Annual Exhibition of Flowers, September 2. Carl Blomberg, for New Nymphæa, Mrs. Anna C. Ames.
" " " " " " Miss Eliza Wellington, for Superior Cultivation of *Clianthus Dampieri.*
" " " " " " J. F. Huss, for *Pennisetum Ruppelii.*
Chrysanthemum Show, November 10. François Supiot, West Philadelphia, Pa., for Violet Luxonne.
" " " " François Supiot, for Violet Princess des Galles.

HONORABLE MENTION.

February 1. William C. Ward, for Carnation Meteor.
" " William C. Ward, for Carnation Bridesmaid.
June 13. Jackson Dawson, for Seedling Rose from Boston Belle.
June 27. Michael H. Walsh, for New Rose Joseph S. Fay.
August 8. Henry A. Dreer, for *Nymphæa O'Marana.*
Annual Exhibition of Flowers, September 2. James Comley, for New Perennial Pea.
Chrysanthemum Show, November 10. François Supiot, for Violet Admiral Avallon.

COMPLIMENTARY NOTICE.

May 23. R. & J. Farquhar & Co., for Canna Italia.
Chrysanthemum Show, November 10. John Breitmeyer & Sons, Detroit, Mich., for Seedling Chrysanthemum.

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1896.

By E. W. WOOD, CHAIRMAN.

The fruit exhibitions during the past season have been more than usually irregular, and considerably below the average of recent years. Apples have been abundant and of excellent quality, exhibitors finding little difficulty in selecting perfect specimens. The Pear crop has been a partial failure.

At the Annual Exhibition there were no specimens noticeable for superior excellence. Very few Peaches of open culture have been shown, and those were of inferior quality. Plums have been shown in less quantity than usual. Some of the Japanese varieties of this fruit which have received favorable notice have been found to be more tender than the old kinds under general cultivation, and we would caution purchasers of the Japanese varieties against the danger of introducing the San José scale into their gardens and orchards, as these trees have been sent out largely from nurseries in New Jersey to other nurseries and growers all over the country, and have been found to be seriously infected with this pest.

Small fruits were shown in about the usual quantity. Grapes, with the exception of the foreign varieties, were not up to the standard either in the size of the bunches or in general appearance. Among commercial growers the practice of girdling the vines is increasing, some asserting that if they could not thus secure the earlier ripening and larger bunches of more attractive

appearance, they would give up the cultivation of this fruit, on account of the competition and low prices prevailing when the crop matures naturally and grapes are sent to this market in large quantities from locations outside the State. The practice of girdling is worthy of the attention of amateur growers, as by its application and by spraying the vines with the copper solutions or Bordeaux mixture the crosses with foreign varieties, which are more subject to mildew than pure natives, may be successfully grown. Girdling is not adapted to varieties having compact bunches, like Moore's Early and Delaware, as the increased size of the berries causes cracking and decay; but the value of the Concord and Worden, the two kinds of dark grapes most widely cultivated, may be increased by the operation.

Strawberries came through the winter in good condition, but set their fruit irregularly, some varieties being affected more than others and producing but a partial crop. At the Strawberry Exhibition some excellent fruit was shown, the Marshall easily taking the lead as an exhibition variety. This is the first season growers for market have given any considerable space to this variety, and the complaint was made that it did not prove as productive as some other kinds. Possibly the peculiarity of the season had something to do with this result, but its large size, superior quality, and fine appearance will make it desirable for the garden, and further experience may make it profitable for the commercial grower. It evidently requires rich soil and high cultivation to secure satisfactory results.

The public showed a growing interest in the exhibitions throughout the season by an increased attendance; these exhibitions afford those interested in fruit growing the best opportunity to learn by comparison the most desirable varieties for cultivation.

The prices received by fruit growers for their product has been, like the crop, unusually irregular. As a result of the over supply of apples for the home market, a larger quantity has been sent to foreign ports than in any previous year, and the returns from the earlier shipments were often unsatisfactory. Pears, owing to the short crop, brought higher prices than have prevailed in recent years. The small fruits brought fair prices and met with a ready sale.

George W. Campbell, Delaware, O., has entered his new grape, Campbell's Early, for the Special Prize offered from the Benjamin

B. Davis Fund, sending samples of the fruit in August, September, and October.

Although the Committee offered in prizes $136 more than their appropriation, owing to the partial failure in several lines of fruit they have awarded in prizes and gratuities only $1,527, leaving an unexpended balance of $273.

E. W. Wood,
C. F. Curtis,
Samuel Hartwell,
Warren Fenno,
} *Committee.*

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1896.

February 1.

Gratuity: —

Leverett M. Chase, Anjou Pears $1 00

March 7.

Gratuity: —

Charles H. Hovey, Pasadena, Cal., Navel Oranges 3 00

SPRING EXHIBITION.

March 24, 25, 26, and 27.

Winter Apples. — Baldwin, J. V. Fletcher 3 00
Second, Samuel Hartwell 2 00
Third, Marshall W. Chadbourne 1 00
Northern Spy, George V. Fletcher 3 00
Second, William T. Hall 2 00
Third, Samuel Hartwell 1 00
Roxbury Russet, George H. Dickerman 3 00
Second, Joshua C. Stone 2 00
Third, Benjamin P. Ware 1 00
Any other variety, George V. Fletcher, Rhode Island Greening . 3 00
Second, M. W. Chadbourne, Hubbardston 2 00
Third, Samuel Hartwell, Blue Pearmain 1 00
Winter Pears. — Any variety, George V. Fletcher, Dana's Hovey, 3 00
Second, Leverett M. Chase, Anjou 2 00

Gratuities: —

Charles H. Hovey, Pasadena, Cal., Oranges and Lemons . . 3 00
B. K. Bliss, Navel Oranges 2 00

June 4.

Gratuities: —

James Comley, Peaches 3 00
William H. Hunt, Strawberries 1 00
William C. Winter, Grapes 1 00

June 13.

Gratuities: —

James Comley, Peaches 2 00
Hon. Joseph S. Fay, Marshall Strawberries 2 00
Charles S. Smith, Bubach Strawberries 1 00
William G. Prescott, Strawberries 2 00
William Doran & Son, Collection of Strawberries 2 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 23 AND 24.

Special Prizes from the Theodore Lyman Fund.

STRAWBERRIES. — For the best four quarts of any variety, Warren Heustis & Son, for Marshall, the Lyman Plate, value . .	20 00
Second, Marshall F. Ewell, for Marshall, the Lyman Plate, value	16 00
Third, Hon. Joseph S. Fay, " " " "	12 00
Fourth, Barnard Farm, " " " "	10 00
Fifth, Sumner Coolidge, " " " "	8 00

Special Prizes offered by the Society.

For the best two quarts of any variety, to be judged by points, Marshall F. Ewell, Marshall	6 00
Second, Hon. Joseph S. Fay, Marshall	5 00
Third, Warren Heustis & Son, Marshall	4 00
Fourth, Sumner Coolidge, Marshall	3 00

Regular Prizes.

For the largest and best collection, not less than twenty baskets of two quarts each, and not less than five varieties, George F. Wheeler	25 00
Ten baskets, not less than three varieties, two quarts each, George F. Wheeler	15 00
Second, George V. Fletcher	12 00
Third, Isaac E. Coburn	10 00
Five baskets, of one variety, two quarts each, Marshall F. Ewell .	8 00
Second, Warren Heustis & Son	6 00
Third, George F. Wheeler	5 00
Fourth, Samuel Hartwell	4 00
Fifth, W. D. Hinds	3 00
Two quarts of Belmont, George V. Fletcher	4 00
Second, Barnard Farm	3 00
Third, Samuel Hartwell	2 00
Bubach, Sumner Coolidge	4 00
Second, Oliver R. Robbins	3 00
Third, George F. Wheeler	2 00
Champion, Barnard Farm	4 00
Second, George F. Wheeler	3 00
Third, Bordman Kenrick	2 00
Charles Downing, Miss Mary S. Walker	4 00
Second, Samuel Hartwell	3 00
Third, William Doran & Son	2 00
Crescent, the second prize to Isaac E. Coburn	3 00

Haverland, William Doran & Son	4 00
Second, Isaac E. Coburn	3 00
Third, George F. Wheeler	2 00
Hersey, George F. Wheeler	4 00
Second, William G. Prescott	3 00
Jessie, George V. Fletcher	4 00
Second, Isaac E. Coburn	3 00
Third, George F. Wheeler	2 00
Leader, George F. Wheeler	4 00
Second, Samuel Wheeler	3 00
Third, Isaac E. Coburn	2 00
Marshall, Marshall F. Ewell	4 00
Second, Hon. Joseph S. Fay	3 00
Third, Warren Heustis & Son	2 00
Miner's Prolific, George F. Wheeler	4 00
Parker Earle, George F. Wheeler	4 00
Sharpless, Samuel Hartwell	4 00
Any other variety, Barnard Farm, Timbrell	4 00
Second, J. D. Gowing, Seedling	3 00
Third, Elliot Moore	2 00
Collection, not less than six varieties, one quart of each, Sumner Coolidge	8 00
Second, George F. Wheeler	6 00
One quart of any new variety not previously exhibited, J. D. Gowing, Seedling	3 00
Second, A. R. Howard, Seedling	2 00
CHERRIES. — Two quarts of any variety, Edwin Hastings	4 00
Second, George V. Fletcher	3 00
Third, Charles S. Smith	2 00
FOREIGN GRAPES. — Two bunches of any variety, Elisha S. Converse	6 00
Second, Elisha S. Converse	4 00
FORCED PEACHES. — Six specimens of any variety, James Comley, Stephenson	3 00
Second, William C. Winter, Amsden	2 00
Gratuity: —	
James Comley, Peaches	2 00

JUNE 27.

STRAWBERRIES. — One quart of any variety, Marshall F. Ewell, Marshall	3 00
Second, Warren Heustis & Son, Marshall	2 00
Third, Hon. Joseph S. Fay, Marshall	1 00
CHERRIES. — Two quarts of Black Eagle, Samuel G. Damon	3 00
Two quarts of Downer's Late, M. W. Chadbourne	3 00
Any other variety, the second prize to E. S. Chapell, Napoleon	2 00
Third, Wilfred Wheeler, Richmond	1 00

JULY 11.

RASPBERRIES. — Two quarts of any variety, William Doran & Son, Red Antwerp 3 00
Second, Elisha S. Converse 2 00
CURRANTS. — Two quarts of any Red variety, Sumner Coolidge, Fay's 4 00
Second, William Doran & Son, Fay's 3 00
Third, Samuel G. Damon, Versaillaise 2 00
Fourth, Benjamin G. Smith, Versaillaise 1 00
Two quarts of any White variety, Nathaniel T. Kidder, White Grape 3 00
Second, Elisha S. Converse, White Grape 2 00
Third, Benjamin G. Smith, Dana's New White 1 00
GOOSEBERRIES. — Two quarts of any Native variety, Joseph S. Chase, Triumph 3 00
Second, Dr. Walter G. Kendall, Columbus 2 00
Third, Warren Heustis & Son, Downing 1 00

Gratuities: —

William C. Winter, Foreign Grapes 1 00
Robert Manning, Florence Cherries 1 00
E. S. Chapell, Napoleon Cherries 1 00
James Comley, Peaches 2 00

JULY 18.

RASPBERRIES. — Two quarts of any variety, Mrs. E. J. Cutter, Cuthbert 3 00
Second, Benjamin G. Smith, Knevett's Giant 2 00
Third, Elisha S. Converse, Cuthbert 1 00
CURRANTS. — One quart of any Red variety, William Doran & Son, Versaillaise 3 00
Second, Sumner Coolidge, Fay's 2 00
Third, Samuel J. Trepess, Versaillaise 1 00
One quart of any White variety, Samuel J. Trepess, White Grape, 2 00
Second, Elisha S. Converse, White Grape 1 00
GOOSEBERRIES. — Two quarts of any Foreign variety, Benjamin G. Smith, Hero of the Nile 3 00
Second, Benjamin P. Ware, English Fancy 2 00
Third, Benjamin G. Smith, Abbotsford 1 00

Gratuity: —

Warren Heustis & Son, Collection 1 00

JULY 25.

BLACKBERRIES. — Two quarts of any variety, Rev. Calvin Terry, Dorchester 3 00
Second, Rev. Calvin Terry, Kittatinny 2 00

Apples. — Tetofsky, George Nelson	3 00
Second, James Comley	2 00
Third, David L. Fiske	1 00
Pears. — Summer Doyenne, Sumner Coolidge	3 00
Second, Elisha S. Converse	2 00
Third, David L. Fiske	1 00
Peaches. — Six of any variety, William C. Winter	3 00
Gratuity: —	
Mrs. E. J. Cutter, Raspberries	1 00

August 1.

Apples. — Red Astrachan, Samuel Hartwell	3 00
Second, Samuel G. Damon	2 00
Third, Charles F. Curtis	1 00
Sweet Bough, George V. Fletcher	3 00
Second, Charles B. Travis	2 00
Third, Sumner Coolidge	1 00
Any other variety, A. M. Knowlton, Yellow Transparent	3 00
Second, George Nelson, Yellow Transparent	2 00
Third, C. C. Shaw, Early Harvest	1 00
Pears. — Giffard, A. T. Brown	3 00
Second, Mrs. Emmons	2 00
Third, Samuel G. Damon	1 00
Any other variety, Sumner Coolidge	3 00
Second, A. T. Brown	2 00
Third, Mrs. S. Klaus	1 00
Blackberries. — Two quarts of any variety, M. W. Chadbourne	3 00
Second, E. W. Wood	2 00
Third, Sumner Coolidge	1 00
Gratuity: —	
James Comley, Collection of Apples	1 00

August 8.

Apples. — Oldenburg, George C. Rice	3 00
Second, E. R. Cook	2 00
Third, J. V. Fletcher	1 00
Any other variety, Luke Tuttle, Red Astrachan	3 00
Second, Charles B. Travis, Sweet Bough	2 00
Third, Samuel Hartwell, Summer Pippin	1 00
Pears. — Clapp's Favorite, Sumner Coolidge	3 00
Second, George V. Fletcher	2 00
Third, Mrs. S. Klaus	1 00
Any other variety, the second prize to Samuel G. Damon, Giffard	2 00
Third, Mrs. Emmons, Giffard	1 00

Porter, C. M. Handley	3 00
Second, George V. Fletcher	2 00
Third, F. J. Kinney	1 00
Pumpkin Sweet, Samuel Hartwell	3 00
Second, George W. Stevens	2 00
Third, Samuel G. Damon	1 00
Any other variety, L. J. Fosdick, Seedling	3 00
Second, C. M. Handley, Wealthy	2 00
Third, C. M. Handley, Fall Orange or Holden	1 00
CRAB APPLES. — Transcendent, L. J. Fosdick	2 00
Second, George W. Stevens	1 00
Any other variety, Orlendo W. Dimick	2 00
Second, Joshua C. Stone	1 00
PEARS. — Bartlett, George V. Fletcher	3 00
Second, Sumner Coolidge	2 00
Third, Charles F. Curtis	1 00
Belle Lucrative, Elisha S. Converse	3 00
Second, A. T. Brown	2 00
Boussock, Charles F. Curtis	3 00
Second, Elmer E. Chipman	2 00
Third, David L. Fiske	1 00
Hardy, David L. Fiske	2 00
Second, Warren Fenno	1 00
Paradise of Autumn, William Milman	3 00
Second, David L. Fiske	2 00
Third, Warren Fenno	1 00
Any other variety, William Milman, Seckel	3 00
Second, A. T. Brown, Seckel	2 00
Third, Warren Fenno, Adams	1 00
PLUMS. — Imperial Gage, George V. Fletcher	3 00
Second, William H. Hunt	2 00
Third, Mrs. M. T. Goddard	1 00
Lombard, John L. Bird	3 00
Second, Mrs. S. Klaus	2 00
Third, Mrs. Mary T. Goddard	1 00
Any other variety, Mrs. Mary T. Goddard, Pond's Seedling	3 00
Second, Mrs. Mary T. Goddard, Golden Egg	2 00
Third, William H. Hunt, Pond's Seedling	1 00
NATIVE GRAPES. — Six bunches of Eumelan, Benjamin G. Smith	3 00
Six bunches of Massasoit, F. J. Kinney	3 00
Second, Benjamin G. Smith	2 00
Third, Samuel G. Damon	1 00
Six bunches of Moore's Early, Oliver R. Robbins	3 00
Second, Samuel G. Damon	2 00
Third, George W. Jameson	1 00
Six bunches of any other variety, Joseph S. Chase, Delaware	3 00
Second, F. J. Kinney, Worden	2 00
Third, Joseph S. Chase, Ulster Prolific	1 00

Six bunches of any variety from girdled vines, F. J. Kinney, Worden 3 00
Second, F. J. Kinney, Concord 2 00
FIGS. — Any variety, William McRoberts 2 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

OCTOBER 1 AND 2.

Special Prizes.

Samuel Appleton Fund.

APPLES. — Baldwin, Joshua C. Stone 5 00
Hubbardston, C. M. Handley 5 00
PEARS. — Sheldon, Samuel G. Damon 5 00

Benjamin V. French Fund.

APPLES. — Gravenstein, Samuel Hartwell 5 00
Rhode Island Greening, Henry E. Rich 5 00

Marshall P. Wilder Fund.

PEARS. — Anjou, Mrs. S. Klaus 4 00
Second, David L. Fiske 3 00
Third, Samuel Hartwell 2 00
Fourth, A. T. Brown 1 00
Bartlett, George V. Fletcher 4 00
Second, Samuel G. Damon 3 00
GRAPES. — Twelve bunches of Concord, George W. Jameson . 4 00
Second, F. J. Kinney 3 00
Third, William Doran & Son 2 00
Fourth, John Parker 1 00
Twelve bunches of Worden, F. J. Kinney 4 00
Second, Samuel Hartwell 3 00
Third, H. R. Kinney 2 00
Fourth, William C. Winter 1 00

Special Prizes offered by the Society.

PEARS. — Anjou, Samuel G. Damon 5 00
Seckel, Samuel Hartwell 5 00
NATIVE GRAPES. — Twelve bunches of any variety, Joseph S. Chase 5 00

Regular Prizes, Theodore Lyman Fund.

APPLES. — Baldwin, Henry E. Rich 4 00
Second, John W. Clark 3 00
Third, A. M. Knowlton 2 00

Porter, C. M. Handley	3 00
Second, George V. Fletcher	2 00
Third, F. J. Kinney	1 00
Pumpkin Sweet, Samuel Hartwell	3 00
Second, George W. Stevens	2 00
Third, Samuel G. Damon	1 00
Any other variety, L. J. Fosdick, Seedling	3 00
Second, C. M. Handley, Wealthy	2 00
Third, C. M. Handley, Fall Orange or Holden	1 00
CRAB APPLES. — Transcendent, L. J. Fosdick	2 00
Second, George W. Stevens	1 00
Any other variety, Orlendo W. Dimick	2 00
Second, Joshua C. Stone	1 00
PEARS. — Bartlett, George V. Fletcher	3 00
Second, Sumner Coolidge	2 00
Third, Charles F. Curtis	1 00
Belle Lucrative, Elisha S. Converse	3 00
Second, A. T. Brown	2 00
Boussock, Charles F. Curtis	3 00
Second, Elmer E. Chipman	2 00
Third, David L. Fiske	1 00
Hardy, David L. Fiske	2 00
Second, Warren Fenno	1 00
Paradise of Autumn, William Milman	3 00
Second, David L. Fiske	2 00
Third, Warren Fenno	1 00
Any other variety, William Milman, Seckel	3 00
Second, A. T. Brown, Seckel	2 00
Third, Warren Fenno, Adams	1 00
PLUMS. — Imperial Gage, George V. Fletcher	3 00
Second, William H. Hunt	2 00
Third, Mrs. M. T. Goddard	1 00
Lombard, John L. Bird	3 00
Second, Mrs. S. Klaus	2 00
Third, Mrs. Mary T. Goddard	1 00
Any other variety, Mrs. Mary T. Goddard, Pond's Seedling	3 00
Second, Mrs. Mary T. Goddard, Golden Egg	2 00
Third, William H. Hunt, Pond's Seedling	1 00
NATIVE GRAPES. — Six bunches of Eumelan, Benjamin G. Smith	3 00
Six bunches of Massasoit, F. J. Kinney	3 00
Second, Benjamin G. Smith	2 00
Third, Samuel G. Damon	1 00
Six bunches of Moore's Early, Oliver R. Robbins	3 00
Second, Samuel G. Damon	2 00
Third, George W. Jameson	1 00
Six bunches of any other variety, Joseph S. Chase, Delaware	3 00
Second, F. J. Kinney, Worden	2 00
Third, Joseph S. Chase, Ulster Prolific	1 00

Six bunches of any variety from girdled vines, F. J. Kinney, Worden 3 00
Second, F. J. Kinney, Concord 2 00
Figs. — Any variety, William McRoberts 2 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

October 1 and 2.

Special Prizes.

Samuel Appleton Fund.

Apples. — Baldwin, Joshua C. Stone 5 00
Hubbardston, C. M. Handley 5 00
Pears. — Sheldon, Samuel G. Damon 5 00

Benjamin V. French Fund.

Apples. — Gravenstein, Samuel Hartwell 5 00
Rhode Island Greening, Henry E. Rich 5 00

Marshall P. Wilder Fund.

Pears. — Anjou, Mrs. S. Klaus 4 00
Second, David L. Fiske 3 00
Third, Samuel Hartwell 2 00
Fourth, A. T. Brown 1 00
Bartlett, George V. Fletcher 4 00
Second, Samuel G. Damon 3 00
Grapes. — Twelve bunches of Concord, George W. Jameson . 4 00
Second, F. J. Kinney 3 00
Third, William Doran & Son 2 00
Fourth, John Parker 1 00
Twelve bunches of Worden, F. J. Kinney 4 00
Second, Samuel Hartwell 3 00
Third, H. R. Kinney 2 00
Fourth, William C. Winter 1 00

Special Prizes offered by the Society.

Pears. — Anjou, Samuel G. Damon 5 00
Seckel, Samuel Hartwell 5 00
Native Grapes. — Twelve bunches of any variety, Joseph S. Chase 5 00

Regular Prizes, Theodore Lyman Fund.

Apples. — Baldwin, Henry E. Rich 4 00
Second, John W. Clark 3 00
Third, A. M. Knowlton 2 00

Dutch Codlin, Warren Fenno	3 00
Fall Orange or Holden, C. M. Handley	3 00
Second, H. R. Kinney	2 00
Third, Henry E. Rich	1 00
Fameuse, George V. Fletcher	3 00
Second, Benjamin G. Smith	2 00
Third, Mrs. C. N. S. Horner	1 00
Fletcher Russet, William H. Teele	3 00
Second, Charles F. Curtis	2 00
Third, George V. Fletcher	1 00
Foundling, C. M. Handley	4 00
Second, Samuel Hartwell	3 00
Gloria Mundi, Samuel Hartwell	3 00
Second, E. R. Cook	2 00
Golden Russet, Henry E. Rich	2 00
Second, Mrs. Mary T. Goddard	1 00
Gravenstein, George V. Fletcher	4 00
Second, Samuel Hartwell	3 00
Third, C. C. Shaw	2 00
Hubbardston, C. B. Lancaster	4 00
Second, Joshua C. Stone	3 00
Third, C. M. Handley	2 00
Hunt Russet, William H. Teele	3 00
Second, William H. Hunt	2 00
Third, Samuel Hartwell	1 00
Jacobs Sweet, Charles F. Curtis	3 00
Lady's Sweet, A. M. Knowlton	2 00
Second, William H. Teele	1 00
Mackintosh, George C. Rice	3 00
Second, Samuel Hartwell	2 00
Third, E. C. Stone	1 00
Maiden's Blush, H. R. Kinney	2 00
Second, Joshua C. Stone	1 00
Mother, David L. Fiske	3 00
Second, H. R. Kinney	2 00
Third, William H. Teele	1 00
Northern Spy, George V. Fletcher	3 00
Second, George C. Rice	2 00
Third, C. C. Shaw	1 00
Porter, George V. Fletcher	3 00
Second, C. M. Handley	2 00
Third, P. G. Hanson	1 00
Pound Sweet, George V. Fletcher	3 00
Second, George C. Rice	2 00
Third, Samuel Hartwell	1 00
Rhode Island Greening, Joshua C. Stone	4 00
Second, Elliott Moore	3 00
Third, George C. Rice	2 00

Roxbury Russet, Nathaniel T. Kidder	4 00
Second, J. A. Leonard	3 00
Third, E. R. Cook	2 00
Sutton, George Cruickshanks	3 00
Second, George C. Rice	2 00
Third, Henry E. Rich	1 00
Tolman's Sweet, Willard P. Plimpton	3 00
Second, George C. Rice	2 00
Third, C. C. Shaw	1 00
Tompkins King, George C. Rice	3 00
Second, F. J. Kinney	2 00
Third, John W. Clark	1 00
Washington Royal, or Palmer, O. B. Hadwen	3 00
Second, George Cruickshanks	2 00
Third, George C. Rice	1 00
Wealthy, C. M. Handley	3 00
Second, W. K. W. Hall	2 00
Third, George C. Rice	1 00
Any other variety, O. B. Hadwen, Bowen	3 00
Second, A. J. Moody	2 00
Third, John Parker	1 00
CRAB APPLES. — Hyslop, M. W. Chadbourne	2 00
Second, Norris R. Comley	1 00
Any other variety, S. Warren	2 00
Second, S. F. & F. L. Weston	1 00

Society's Prizes.

PEARS. — Angouleme, A. T. Brown	4 00
Second, Samuel G. Damon	3 00
Third, Mrs. Emmons	2 00
Fourth, Warren Fenno	1 00
Bosc, Sumner Coolidge	4 00
Second, Warren Fenno	3 00
Third, A. T. Brown	2 00
Fourth, Arthur Coolidge	1 00
Clairgeau, William T. Hall	3 00
Second, Samuel G. Damon	2 00
Third, Warren Fenno	1 00
Comice, A. T. Brown	3 00
Second, Warren Fenno	2 00
Third, Leverett M. Chase	1 00
Dana's Hovey, A. T. Brown	4 00
Second, Samuel G. Damon	3 00
Third, Willard P. Plimpton	2 00
Fourth, Charles E. Swain	1 00
Diel, Charles E. Swain	3 00
Second, Benjamin G. Smith	2 00
Third, J. R. Magullion	1 00

Fulton, Elisha S. Converse	3 00
Second, John L. Bird	2 00
Hardy, Warren Fenno	3 00
Howell, Benjamin G. Smith	3 00
Second, Warren Fenno	2 00
Third, George F. Wheeler	1 00
Josephine of Malines, Warren Fenno	3 00
Second, John L. Bird	2 00
Third, L. W. Goodell	1 00
Lawrence, A. T. Brown	3 00
Second, Leverett M. Chase	2 00
Third, Warren Fenno	1 00
Louise Bonne of Jersey, Sumner Coolidge	3 00
Second, Warren Fenno	2 00
Third, Benjamin G. Smith	1 00
Marie Louise, Charles E. Swain	3 00
Second, Mr. Jones	2 00
Third, Warren Fenno	1 00
Merriam, Sumner Coolidge	3 00
Second, Samuel G. Damon	2 00
Third, A. T. Brown	1 00
Seckel, Charles F. Curtis	4 00
Second, Charles E. Swain	3 00
Third, A. T. Brown	2 00
Fourth, Mrs. S. Klaus	1 00
Sheldon, A. T. Brown	4 00
Second, Sumner Coolidge	3 00
Third, Samuel G. Damon	2 00
Fourth, William Milman	1 00
St. Michael Archangel, Warren Heustis & Son	3 00
Second, Benjamin G. Smith	2 00
Third, Warren Fenno	1 00
Superfin, Sumner Coolidge	3 00
Second, Warren Fenno	2 00
Urbaniste, A. T. Brown	3 00
Second, Charles E. Swain	2 00
Third, Mrs. Emmons	1 00
Vicar, A. T. Brown	3 00
Second, Mrs. Jones	2 00
Third, Sumner Coolidge	1 00
Winter Nelis, A. T. Brown	3 00
Second, Mrs. Emmons	2 00
Third, Clifford Weld	1 00
Any other variety, Charles B. Travis, Onondaga	3 00
Second, Warren Fenno, "	2 00
Third, John J. Merrill, "	1 00

QUINCES. — Champion, Charles S. Smith	3 00
Second, Orlendo W. Dimick	2 00
Third, George V. Fletcher	1 00
Orange, J. E. Richardson	3 00
Second, George V. Fletcher	2 00
Third, Arthur F. Coolidge	1 00
Pear, E. R. Cook	3 00
Second, George V. Fletcher	2 00
Third, Benjamin G. Smith	1 00
Rea, Mrs. Mary T. Goddard	3 00
Second, George S. Curtis	2 00
Third, Benjamin G. Smith	1 00
PEACHES, ORCHARD HOUSE CULTURE. — William C. Winter	4 00
PLUMS. — Yellow Egg, George V. Fletcher	2 00
Any other variety, Samuel G. Damon	2 00
Second, George V. Fletcher	1 00
NATIVE GRAPES. — Six bunches of Brighton, Samuel Hartwell	3 00
Second, Benjamin G. Smith	2 00
Third, M. W. Chadbourne	1 00
Delaware, Joseph S. Chase	4 00
Second, Samuel G. Damon	3 00
Third, Benjamin G. Smith	2 00
Fourth, Samuel Hartwell	1 00
Herbert, Samuel G. Damon	3 00
Second, Joseph S. Chase	2 00
Iona, Samuel G. Damon	3 00
Second, Joseph S. Chase	2 00
Third, Francis Blake	1 00
Lindley, Benjamin G. Smith	3 00
Second, Samuel G. Damon	2 00
Niagara, Oliver R. Robbins	3 00
Second, Samuel G. Damon	2 00
Third, Joseph S. Chase	1 00
Pocklington, Mrs. J. H. Jackman	4 00
Second, Samuel Hartwell	3 00
Third, P. G. Hanson	2 00
Fourth, S. F. & F. L. Weston	1 00
Prentiss, Benjamin G. Smith	3 00
Second, Joseph S. Chase	2 00
Wilder, Benjamin G. Smith	3 00
Second, Samuel G. Damon	2 00
Any other variety, Mrs. M. Haller, Salem	3 00
Second, Benjamin G. Smith, Merrimack	2 00
Third, F. J. Kinney, Salem	1 00
Concord from girdled vines, F. J. Kinney	3 00
Second, H. R. Kinney	2 00

CRANBERRIES. — Half-peck, L. J. Fosdick	3 00
Second, L. J. Fosdick	2 00
Third, L. J. Fosdick	1 00
Gratuities: —	
Benjamin G. Smith, Display of Grapes	5 00
Warren Fenno, Collection	3 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 21.

Benjamin V. French Fund.

APPLES. — Baldwin, John W. Clark	5 00
Hubbardston, C. M. Handley	5 00

Society's Prizes.

APPLES. — Baldwin, William Doran & Son	3 00
Second, J. V. Fletcher	2 00
Third, M. W. Chadbourne	1 00
Danvers Sweet, Warren Fenno	3 00
Second, C. M. Handley	2 00
Fletcher Russet, Charles F. Curtis	3 00
Second, George V. Fletcher	2 00
Third, William H. Teele	1 00
Hubbardston, Amos T. Leavitt	3 00
Second, C. M. Handley	2 00
Third, M. W. Chadbourne	1 00
Hunt Russet, Samuel Hartwell	3 00
Lady's Sweet, A. M. Knowlton	3 00
Northern Spy, George V. Fletcher	3 00
Second, Littlefield Farm	2 00
Third, William Doran & Son	1 00
Rhode Island Greening, George V. Fletcher	3 00
Second, J. W. Clark	2 00
Third, E. W. Wood	1 00
Roxbury Russet, George C. Rice	3 00
Second, George V. Fletcher	2 00
Third, Samuel Hartwell	1 00
Tolman's Sweet, Mrs. Sarah M. Moore	3 00
Second, George C. Rice	2 00
Third, Willard P. Plimpton	1 00
Tompkins King, George C. Rice	3 00
Second, Samuel Hartwell	2 00
Third, E. C. Stone	1 00

Any other variety, George C. Rice, Mackintosh	3 00
Second, George C. Rice, Yellow Bellflower	2 00
Third, George V. Fletcher, Pound Sweet	1 00
PEARS. — Angouleme, Samuel G. Damon	4 00
Second, A. T. Brown	3 00
Third, Mrs. Emmons	2 00
Fourth, Warren Fenno	1 00
Anjou, A. T. Brown	4 00
Second, Mrs. S. Klaus	3 00
Third, Charles E. Swain	2 00
Fourth, Samuel G. Damon	1 00
Clairgeau, William T. Hall	3 00
Second, Warren Fenno	2 00
Third, Samuel G. Damon	1 00
Comice, A. T. Brown	3 00
Dana's Hovey, A. T. Brown	4 00
Second, Samuel G. Damon	3 00
Third, Charles E. Swain	2 00
Fourth, Benjamin G. Smith	1 00
Diel, Charles E. Swain	3 00
Second, A. T. Brown	2 00
Third, Benjamin G. Smith	1 00
Glout Morceau, Warren Fenno	3 00
Second, Clifford Weld	2 00
Josephine of Malines, Warren Fenno	3 00
Second, John L. Bird	2 00
Langelier, A. T. Brown	3 00
Second, Mrs. S. Klaus	2 00
Third, T. M. Davis	1 00
Lawrence, A. T. Brown	3 00
Second, Warren Fenno	2 00
Third, Mrs. Emmons	1 00
Vicar, Mrs. Jones	3 00
Second, John J. Merrill	2 00
Third, A. T. Brown	1 00
Winter Nelis, A. T. Brown	3 00
Second, Mrs. Emmons	2 00
Third, Clifford Weld	1 00
Any other variety, Warren Fenno, Duchess of Bordeaux	3 00
Second, S. F. & F. L. Weston, Columbia	2 00
Third, Clifford Weld	1 00
Gratuities: —	
L. J. Fosdick, Cranberries	1 00
Rev. Calvin Terry, Cranberries	1 00

REPORT

OF THE

COMMITTEE ON VEGETABLES,

FOR THE YEAR 1896.

By CHARLES N. BRACKETT, CHAIRMAN.

The exhibition season for the year 1896 is just concluded, and a brief report of the doings of your Committee is now in order.

We are highly gratified to be able to report that our exhibitions in this department the past year have shown an onward movement, which testifies more plainly than any other evidence could do that the progress which is being made in vegetable culture is highly satisfactory. In each and every class the state of perfection in which the generality of exhibitors brought their various productions to the contest has been very good, and after making due allowance for the diversity of location and the effect upon some crops of the contingencies of the weather, we have seen quite enough to satisfy us that intelligent minds are engaged and careful hands are at work in growing the various products of the earth to that high degree of luxuriance and perfection which the judicious union of art in aid of nature's efforts can alone effect. Still, at none of our exhibitions has there been the least difficulty in detecting the marked difference between the well tended crop and its less fortunate competitor.

With a season favorable to vegetable growth, our weekly shows, from the first Saturday in July to the Annual Exhibition, have been unusually full and fine, and seemed to be thoroughly appreciated by the visiting public.

As usual, very good exhibits of forced vegetables were made

during the months of January and February. A. W. Crockford's Mushrooms, shown on several occasions during the winter, were remarkably fine and well grown specimens, deserving high commendation.

But few new vegetables were shown the past year requiring special mention. July 11 H. R. Kinney showed a new Pea under the name of Buck's New Life, a pea of the largest size, perfect in form and color, but lacking in quality. Of recent introduction, the Juno, a pea exhibited here last year for the first time, was shown July 25 by James Comley. While possessing all the points of the above mentioned variety, it can claim an additional and very important point; namely, quality. It is a pea of delicious flavor, and seemed to the Committee worthy of cultivation.

August 22 A. T. Brown exhibited a new and very large Tomato called Buckeye State. The specimens were well grown, but like most varieties of the largest size this will probably be found too late for profitable cultivation by the market gardener. On the same date a novelty in the way of a new Tomato with variegated foliage was shown by L. W. Goodell.

At this show the Boston Mycological Club made the largest display of the season, about 150 varieties of Fungi. Hollis Webster was the largest contributor, taking the first prize at this and subsequent prize days during the season. We note the continuance of the lively interest mentioned in last year's report in these exhibitions of our Native Mushrooms, both by members and visitors.

Your Committee are of the opinion that prizes should be offered for only known, named, edible varieties, and that such exhibits should be shown separately, and not mixed up on the same table with poisonous or doubtful varieties. Shown in this manner, they would become object lessons to the student of this subject, who would soon learn to know them at sight.

At a recent meeting of the Society the following vote was passed with reference to these exhibits in future, to which the attention of those interested is called:

"Voted, That the Vegetable Committee be requested to provide cards distinctively colored (red or otherwise), and having the word 'Poisonous' plainly printed thereon, and that exhibitors of Fungi not known to be edible be required to use these cards in labelling all such exhibits when shown in Horticultural Hall."

September 12, the last of the weekly exhibitions, was as usual the largest and one of the best of the season. Nearly all the prizes were competed for and awarded.

The display of Potatoes at the Annual Exhibition formed as usual one of the most interesting features of this show, the variety being great (ninety-five dishes were shown) and the quality unsurpassed. C. H. Thomas again took the first prize for the best four varieties. Celery, Cauliflowers, Tomatoes, Squashes, Egg Plants, etc., were also most richly represented.

The various root crops are deserving of special mention, for we have never seen finer or more perfect specimens of the different varieties of Beets, Carrots, Parsnips, and Turnips than were shown at this exhibition. We are pleased to bear testimony to H. R. Kinney's skill as a grower of fine vegetables, as manifested in the very fine specimens which on several occasions gained for him the first premium. He also secured the first prize at this exhibition for the best collection of vegetables arranged for effect.

The display of Tomatoes, consisting of sixty dishes, mainly of standard kinds, was, owing to the lateness of the season, not equal to that made on September 12. The first prize for the best three varieties was awarded to E. C. Lewis. Hon. Aaron Low was the largest contributor, showing some twenty or more varieties.

Competition for prizes the past year has been unusually close and spirited, and the Committee in making the awards have seldom had their powers of discrimination so thoroughly tested.

The amount appropriated for the year 1896 was . .	$1,150 00
The Committee have awarded in prizes and gratuities .	1,107 00
Leaving an unexpended balance of . . .	$43 00

All of which is respectfully submitted.

For the Committee,

C. N. Brackett, *Chairman.*

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1896.

January 11.

Radishes. — Four bunches of any variety, Arthur F. Coolidge	$3 00
Cucumbers. — Pair of any variety, Francis Blake	3 00
Second, Arthur F. Coolidge	2 00
Third, Francis Blake	1 00
Cauliflowers. — Four specimens, William H. Teele	3 00
Lettuce. — Four heads of Tennisball, Joshua C. Stone	3 00
Second, Arthur F. Coolidge	2 00
Third, H. R. Kinney	1 00
Parsley. — Two quarts, David Nevins	2 00
Second, W. N. Craig	1 00
Mushrooms. — Twenty-four specimens, A. W. Crockford	3 00
Second, Elisha S. Converse	2 00
Tomatoes. — Twelve specimens, William C. Winter, Chemin	3 00
Second, W. N. Craig, May's Favorite	2 00
Third, William C. Winter, Essex	1 00
Gratuities : —	
Warren Heustis & Son, Celery	1 00
A. W. Crockford, Mushrooms	1 00

February 1.

Radishes. — Four bunches of any variety, Joshua C. Stone	2 00
Cucumbers. — Pair of any variety, Francis Blake	3 00
Dandelions. — Peck, David Nevins	3 00
Second, William C. Winter	2 00
Lettuce. — Four heads of Tennisball, Joshua C. Stone	3 00
Mushrooms. — Twenty-four specimens, A. W. Crockford	3 00
Rhubarb. — Twelve stalks, C. F. Smith	3 00
Second, George Sanderson	2 00
Third, Norris R. Comley	1 00
Tomatoes. — Twelve specimens, Francis Blake	3 00
Second, William C. Winter, President Cleveland	2 00
Third, William C. Winter, Chemin	1 00
Gratuity : —	
Norris R Comley, Rhubarb	1 00

FEBRUARY 8.

Gratuities: —

M. Ernest Moore, Lettuce	1 00
Norris R. Comley, Rhubarb	1 00
George Seaverns, Tomatoes	1 00

FEBRUARY 15.

Gratuity: —

Norris R. Comley, Rhubarb	1 00

FEBRUARY 29.

Gratuities: —

Warren Heustis & Son, Dandelions	1 00
Rev. Calvin Terry, Canada Squashes	1 00

SPRING EXHIBITION.

MARCH 24, 25, 26, AND 27.

RADISHES. — Four bunches of Turnip Rooted, Joshua C. Stone	2 00
Second, A. W. Crockford	1 00
CUCUMBERS. — Pair of White Spine, M. D. Hawes	3 00
Second, M. Ernest Moore	2 00
Third, Francis Blake	1 00
DANDELIONS. — Peck, Warren Heustis & Son	3 00
Second, Arthur F. Coolidge	2 00
Third, Hon. Aaron Low	1 00
LETTUCE. — Four heads of Tennisball, John L. Gardner	3 00
Second, Arthur F. Coolidge	2 00
Third, Joshua C. Stone	1 00
WATER CRESS. — Two quarts, Benjamin P. Ware	2 00
PARSLEY. — Two quarts, David Nevins	2 00
Second, Arthur F. Coolidge	1 00
MUSHROOMS. — Twenty-four specimens, A. W. Crockford	3 00
RHUBARB. — Twelve stalks, the second prize to George Sanderson	2 00
TOMATOES. — Twelve specimens, Francis Blake, Essex	3 00
Second, Francis Blake, Nicholson	2 00
Third, William Nicholson, Nicholson	1 00

Gratuities: —

Ettore Tassinari, Onions	1 00
Rev. Calvin Terry, Potatoes	1 00
M. W. Chadbourne, Artichokes	1 00
Warren Heustis & Son, Dandelions	1 00
Arthur F. Coolidge, Collection	1 00

APRIL 4.

CUCUMBERS. — Pair of White Spine, M. Ernest Moore	3 00
Second, Francis Blake	2 00
Third, James Comley	1 00
Gratuities: —	
Hon. Aaron Low, twenty varieties of Potatoes	3 00
M. Ernest Moore, Lettuce	1 00
Warren Heustis & Son, Beet Greens	1 00

APRIL 11.

Gratuities: —	
William Nicholson, Tomatoes	1 00
Warren Heustis & Son, Dandelions	1 00
James Comley, Cucumbers	1 00

APRIL 17.

Gratuities: —	
James Comley, Cucumbers	1 00
Warren Heustis & Son, Dandelions	1 00

MAY EXHIBITION.

MAY 2.

ASPARAGUS. — Four bunches, twelve stalks each, L. W. Weston	3 00
Second, Hon. George Heywood	2 00
CUCUMBERS. — Pair of White Spine, M. Ernest Moore	3 00
Second, M. D. Hawes	2 00
Third, Arthur F. Coolidge	1 00
SPINACH. — Peck, Arthur F. Coolidge	3 00
DANDELIONS. — Peck, M. Ernest Moore	2 00
Second, Hon. Aaron Low	1 00
LETTUCE. — Four heads, M. E. Moore	3 00
Second, Arthur F. Coolidge	2 00
RHUBARB. — Twelve stalks, P. G. Hanson	2 00
Second, George Sanderson	1 00
Gratuities: —	
W. N. Craig, Collection	3 00
William Nicholson, Tomatoes	1 00

MAY 9.

Gratuities: —	
Hon. George Heywood, Asparagus	1 00
L. W. Weston, Asparagus	1 00
P. G. Hanson, Collection	2 00
Warren Heustis & Son, Collection	1 00

MAY 16.

Gratuities : —

P. G. Hanson, Asparagus and Rhubarb	2 00
Mrs. Mary T. Goddard, Cauliflowers	2 00
Hon. George Heywood, Asparagus	1 00
L. W. Weston, Asparagus	1 00
Warren Heustis & Son, Lettuce	1 00

MAY 28.

Gratuities : —

Hon. George Heywood, Asparagus	2 00
P. G. Hanson, Asparagus	1 00
Warren Heustis & Son, Lettuce and Radishes	1 00

RHODODENDRON SHOW.

JUNE 4 AND 5.

Theodore Lyman Fund.

BEETS. — Twelve specimens, any variety, John J. Lyon	3 00
Second, Arthur F. Coolidge	2 00
Third, Mrs. M. T. Goddard	1 00
CARROTS. — Twelve Short Scarlet, W. N. Craig	3 00
Second, Mrs. Mary T. Goddard	2 00
RADISHES. — Four bunches of Turnip Rooted, George D. Moore	2 00
Second, H. R. Kinney	1 00
Four bunches of Long Scarlet, George D. Moore	2 00
Second, H. R. Kinney	1 00
ASPARAGUS. — Four bunches, twelve stalks each, P. G. Hanson	3 00
Second, William H. Hunt	2 00
Third, Hon. George Heywood	1 00
CUCUMBERS. — Pair, Francis Blake	3 00
Second, H. R. Kinney	2 00
Third, George D. Moore	1 00
LETTUCE. — Four heads, Warren Heustis & Son	3 00
Second, George D. Moore	2 00
Third, Arthur F. Coolidge	1 00
RHUBARB. — Twelve stalks, Warren Heustis & Son	3 00
Second, P. G. Hanson	2 00
Third, Arthur F. Coolidge	1 00
MUSHROOMS. — Twenty-four specimens, H. R. Kinney	3 00
TOMATOES. — Twelve specimens, William C. Winter, President Cleveland	3 00
Second, W. N. Craig, May's Favorite	2 00
Third, W. N. Craig, Eclipse	1 00

Gratuities : —

Hon. Joseph S. Fay, Cauliflowers	1 00
Hon. Joseph S. Fay, Lettuce	1 00
P. G. Hanson, Rhubarb	1 00
Mrs. Mary T. Goddard, Cauliflowers	1 00
Warren Heustis & Son, Collection	2 00
Arthur F. Coolidge, "	1 00
George D. Moore, "	1 00

JUNE 13.

Gratuities : —

Hon. George Heywood, Asparagus	1 00
Norris R. Comley, Cucumbers	1 00
Warren Heustis & Son, Rhubarb	1 00
Hon. Joseph S. Fay, Collection	3 00

JUNE 20.

Gratuities : —

Hon. Joseph S. Fay, Cauliflowers and Lettuce	2 00
Warren Heustis & Son, Collection	2 00

ROSE AND STRAWBERRY SHOW.

JUNE 23 AND 24.

BEETS. — Twelve Summer Turnip Rooted, Sumner Coolidge	3 00
Second, Warren Heustis & Son	2 00
Third, Arthur F. Coolidge	1 00
ONIONS. — Twelve specimens, Warren Heustis & Son	3 00
Second, Sumner Coolidge	2 00
Third, Samuel J. Trepess	1 00
CUCUMBERS. — Pair of White Spine, Warren Heustis & Son	3 00
Second, Arthur F. Coolidge	2 00
Third, Joshua C. Stone	1 00
CABBAGES. — Three of any variety, Warren Heustis & Son, All Seasons	3 00
Second, Hon. Joseph S. Fay	2 00
Third, Warren Heustis & Son, Succession	1 00
LETTUCE. — Four heads of any variety, Arthur F. Coolidge	2 00
Second, Sumner Coolidge	1 00
PEAS. — Half-peck of any variety, Hon. Joseph S. Fay, American Wonder	3 00
Second, Elliott Moore, Notts Excelsior	2 00
Third, George V. Fletcher, American Wonder	1 00

Gratuities : —

James Comley, Potatoes	1 00
William C. Winter, Tomatoes	1 00
M. T. Stevens, Tomatoes	1 00
Warren Heustis & Son, Collection	2 00

JUNE 27.

POTATOES. — Twelve specimens, C. W. Hubbard	3 00
Second, James Comley	2 00
ONIONS. — Twelve specimens, Warren Heustis & Son	2 00
Second, George D. Moore	1 00
SQUASHES. — Four Long Warted, Joshua C. Stone	2 00
Second, Arthur F. Coolidge	1 00
Four Scalloped, Sumner Coolidge	2 00
Second, Arthur F. Coolidge	1 00
CABBAGES. — Three of any variety, trimmed, George D. Moore	3 00
Second, Warren Heustis & Son, All Seasons	2 00
Third, Warren Heustis & Son, Wakefield	1 00
BEANS. — Half-peck of String, any variety, Arthur F. Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, Sumner Coolidge	1 00
PEAS. — Half-peck of American Wonder, Hon. Joseph S. Fay	3 00
Second, Isaac E. Coburn	2 00

Gratuities : —

Warren Heustis & Son, Collection	2 00
George D. Moore, "	2 00

JULY 11.

Levi Whitcomb Fund.

CABBAGES. — Three Drumhead, trimmed, George D. Moore	3 00
Second, Warren Heustis & Son	2 00
BEANS. — Half-peck of Cranberry, Samuel Hartwell	3 00
Second, Joshua C. Stone	2 00
Third, George D. Moore	1 00
PEAS. — Half-peck of any variety, George V. Fletcher, Stratagem	3 00
Second, Isaac E. Coburn, Advancer	2 00
Third, George V. Fletcher, Advancer	1 00
SWEET CORN. — Twelve ears, Sumner Coolidge	3 00
Second, Joshua C. Stone	2 00
TOMATOES. — Open culture, twelve specimens, E. N. Pierce, Stone,	3 00
Second, Isaac E. Coburn, Comrade	2 00
Third, Samuel J. Trepess, Faultless	1 00

Gratuities : —

Nathaniel T. Kidder, Tomatoes	1 00
H. R. Kinney, New Pea, Buck's New Life	1 00
H. R. Kinney, Stratagem Peas	1 00
Warren Heustis & Son, Collection	2 00
George D. Moore, Collection	1 00

JULY 18.

POTATOES. — Twelve specimens, Hon. Joseph S. Fay, Hebron	3 00
Second, Hon. Joseph S. Fay, Rose	2 00
Third, Isaac E. Coburn, Rose	1 00
LETTUCE. — Four heads of any variety, Warren Heustis & Son	2 00
Second, John Jeffries	1 00
SWEET CORN. — Twelve ears, Sumner Coolidge, Hybrid	3 00
Second, Francis Blake, Crosby	2 00
Third, Sumner Coolidge, Corey	1 00
TOMATOES. — Open culture, twelve specimens, Isaac E. Coburn	3 00
Second, Samuel J. Trepess, May's Favorite	2 00
Third, Samuel J. Trepess, Faultless	1 00

JULY 18.

Gratuities : —

Hon. Aaron Low, Collection of Beans	2 00
Isaac E. Coburn, Peas	1 00
Rev. Calvin Terry, Peas and Beans	1 00
Warren Heustis & Son, Collection	2 00

JULY 25.

POTATOES. — Any variety, twelve specimens, Isaac E. Coburn, Clark	3 00
Second, Benjamin P. Ware, Roberts's Early	2 00
Third, James Comley, Early Harvest	1 00
SQUASHES. — Three Marrow, Sumner Coolidge	3 00
PEAS. — Half-peck of any variety, Hon. Aaron Low, Stratagem	3 00
Second, James Comley, Juno	2 00
Third, Isaac E. Coburn, Heroine	1 00
SWEET CORN. — Twelve ears of Crosby, Sumner Coolidge	3 00
Second, Francis Blake	2 00
Twelve ears of any other variety, Sumner Coolidge, Hybrid	3 00
TOMATOES. — Twelve specimens, Samuel J. Trepess, May's Favorite	3 00
Second, Samuel J. Trepess, Stone	2 00
Third, Samuel J. Trepess, Faultless	1 00
NATIVE MUSHROOMS. — Named collection, edible and poisonous varieties to be shown separately, and to be so designated, Hollis Webster	5 00
Third, William W. Burlen	3 00

Gratuities: —

Hon. Aaron Low, Tomatoes	1 00
David Fisk, Horticultural Beans	1 00
James Comley, Collection	3 00
John Jeffries, "	1 00

AUGUST 1.

BEANS. — Two quarts of Goddard, shelled, Warren Heustis & Son	3 00
Second, Samuel Hartwell	2 00
Third, Rev. Calvin Terry	1 00
Half-peck of Horticultural, Isaac E. Coburn	3 00
Second, Sumner Coolidge	2 00
Third, Joshua C. Stone	1 00
TOMATOES. — Twelve specimens of Comrade, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00
Twelve specimens of Stone, Joshua C. Stone	3 00
Twelve specimens of any other variety, Samuel J. Trepess, May's Favorite	3 00
EGG PLANT. — Four specimens of Round Purple, Arthur F. Coolidge	3 00
Second, Sumner Coolidge	2 00

Gratuities: —

Dr. George E. Francis, Twenty-six varieties of Mushrooms	2 00
Alexander L. Hayes, Mushrooms	1 00
Arthur F. Coolidge, Celery	1 00
Hon. Aaron Low, Collection	2 00
Warren Heustis & Son, Collection	1 00

AUGUST 8.

GREENFLESH MELONS. — Four specimens, Arthur F. Coolidge	3 00
Second, Joshua C. Stone	2 00
SALMON FLESH MELONS. — Four specimens, Joshua C. Stone	3 00
SWEET CORN. — Twelve ears, Rev. Calvin Terry	3 00
Second, Sumner Coolidge	2 00
Third, Oliver R. Robbins	1 00
EGG PLANT. — Four specimens of Round Purple, Arthur F. Coolidge	2 00
Second, Joshua C. Stone	1 00

Gratuities: —

Boston Mycological Club, Fungi	2 00
Samuel Hartwell, Collection	1 00
Hon. Aaron Low, "	1 00

AUGUST 15.

POTATOES. — Twelve specimens of any variety, Samuel Hartwell, Rose 3 00
Second, Isaac E. Coburn, Hebron 2 00
Third, Samuel Hartwell, Hebron 1 00
ONIONS. — Twelve specimens, Sumner Coolidge 3 00
Second, Benjamin P. Ware, Cracker 2 00
Third, Benjamin P. Ware, Silver Skin 1 00
GREENFLESH MELONS. — Four specimens, Arthur F. Coolidge . 3 00
Second, Joshua C. Stone 2 00
SALMON FLESH MELONS. — Any variety, four specimens, Joshua C. Stone 3 00
Second, Frank M. Stone 2 00
CELERY. — Four roots of any variety, Arthur F. Coolidge, Paris Golden 3 00
Second, Warren Heustis & Son, Paris Golden 2 00
Third, Arthur F. Coolidge, Pascal 1 00
BEANS. — Two quarts of Large Lima, Sumner Coolidge . . . 3 00
Two quarts of Goddard, shelled, Benjamin P. Ware . . . 3 00
Second, Isaac E. Coburn 2 00
Third, Warren Heustis & Son 1 00
SWEET CORN. — Twelve ears of Potter's Excelsior, Isaac E. Coburn 3 00
Second, Hon. Aaron Low 2 00
Third, Rev. Calvin Terry 1 00
Twelve ears of any other variety, P. G. Hanson, Quincy Market, 3 00
Second, E. C. Lewis, Quincy Market 2 00
Third, Hon. Aaron Low, Melrose 1 00
PEPPERS. — Twelve specimens of Squash, George Lincoln . . 3 00
Second, Arthur F. Coolidge 2 00
Third, P. G. Hanson 1 00
Any other variety, E. C. Lewis, Ruby King 3 00

Gratuities: —
James Comley, Collection 3 00
E. C. Lewis, " 3 00
Hon. Aaron Low, " 1 00
Warren Heustis & Son, Collection 1 00
William C. Bates, Mushrooms 1 00
Henry F. Kellogg, " 1 00

AUGUST 22.

GREENFLESH MELONS. — Four specimens, Joshua C. Stone . . 3 00
Second, Arthur F. Coolidge 2 00
Third, Isaac E. Coburn 1 00

SALMON FLESH MELONS. — Four specimens, Joshua C. Stone . 3 00
Second, Frank M. Stone 2 00
WATERMELONS. — Pair, Joshua C. Stone 3 00
CABBAGES. — Three of any variety, trimmed, Arthur F. Coolidge . 3 00
CELERY. — Four roots, Arthur F. Coolidge, Paris Golden . . 3 00
Second, Arthur F. Coolidge, Pascal 2 00
Third, Warren Heustis & Son, Paris Golden 1 00
BEANS. — Two quarts of Large Lima, Sumner Coolidge . . . 3 00
Two quarts of Dwarf Lima, Isaac E. Coburn 3 00
MARTYNIAS. — Twelve specimens, M. W. Chadbourne . . . 2 00
Second, Samuel J. Trepess 1 00
NATIVE MUSHROOMS. — Named collection, edible and poisonous varieties to be shown separately, and to be so designated, Hollis Webster 5 00
Second, Dr. George E. Francis 4 00
Third, J. C. Young 3 00

Gratuities: —

A. T. Brown, Tomatoes 1 00
Warren Heustis & Son, Celery 1 00
Hon. Aaron Low, Collection 2 00
Samuel Hartwell, " 1 00
P. G. Hanson, " 1 00
Mrs. E. M. Gill, " 1 00

SEPTEMBER 12.

TURNIPS. — Twelve Flat, H. R. Kinney 3 00
Second, John Jeffries 2 00
GREENFLESH MELONS. — Four specimens, E. C. Lewis . . . 3 00
Second, Sumner Coolidge 2 00
Third, Samuel Hartwell 1 00
SALMON FLESH MELONS. — Four specimens, Joshua C. Stone . 3 00
WATERMELONS. — Two specimens, Joshua C. Stone . . . 3 00
CAULIFLOWERS. — Four specimens, William H. Teele . . . 3 00
LETTUCE. — Four heads of any variety, H. R. Kinney . . . 3 00
Second, Sumner Coolidge 2 00
Third, George E. Sanderson 1 00
CELERY. — Four roots of any variety, Arthur F. Coolidge . . 3 00
Second, Warren Heustis & Son, Pascal 2 00
Third, Warren Heustis & Son, Paris Golden 1 00
PARSLEY. — Two quarts, Sumner Coolidge 2 00
Second, Arthur F. Coolidge 1 00
BEANS. — Large Lima, two quarts, Sumner Coolidge . . . 3 00
Second, E. C. Lewis 2 00
Third, Mrs. Mary T. Goddard 1 00

Corn. — Sweet, twelve ears of Potter's Excelsior, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00
Third, Rev. Calvin Terry	1 00
Any other sweet variety, P. G. Hanson, Crosby	3 00
Second, P. G. Hanson, Quincy Market	2 00
Third, Rev. Calvin Terry, Crosby	1 00
Egg Plants. — Four Round Purple, H. R. Kinney	3 00
Second, Arthur F. Coolidge	2 00
Third, Sumner Coolidge	1 00
Tomatoes. — Three varieties, twelve specimens each, Hon. Aaron Low, Paragon, Perfection, Acme	5 00
Second, Hon. Aaron Low, Essex, Ignotum, Imperial	4 00
Third, David L. Fisk	3 00
Twelve Comrade, David L. Fisk	3 00
Second, Hon. Aaron Low	2 00
Third, Isaac E. Coburn	1 00
Twelve May's Favorite, Hon. Aaron Low	3 00
Second, Samuel J. Trepess	2 00
Third, Isaac E. Coburn	1 00
Twelve Stone, Hon. Aaron Low	3 00
Second, P. G. Hanson	2 00
Third, Sumner Coolidge	1 00
Twelve of any other variety, David L. Fisk, Beauty	3 00
Second, Arthur F. Coolidge	2 00
Third, Isaac E. Coburn	1 00
Martynias. — Twelve specimens, Hon. Aaron Low	2 00
Second, Samuel J. Trepess	1 00
Okra. — Twelve specimens, E. C. Lewis	2 00
Second, E. C. Lewis, Dwarf	1 00
Peppers. — Twelve specimens of Squash, Hon. Aaron Low	2 00
Second, George W. Jameson	1 00
Any other variety, Hon. Aaron Low, Ruby King	2 00
Second, E. C. Lewis, Ruby King	1 00
Native Mushrooms. — Named collection, edible and poisonous varieties to be shown separately, and to be so designated, Hollis Webster	5 00
Second, Ellen W. Rumrill	4 00
Third, A. P. Doughty	3 00
Gratuities: —	
Hon. Aaron Low, Collection of Tomatoes	5 00
E. C. Lewis, Collection	5 00
Warren Heustis & Son, "	2 00
Arthur F. Coolidge, "	3 00
P. G. Hanson, "	1 00

September 26.

Gratuity: —	
Warren Heustis & Son, Celery	1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

OCTOBER 1 AND 2.

Regular Prizes.

BEETS. — Twelve Turnip Rooted, C. H. Thomas	3 00
Second, Joshua C. Stone	2 00
Third, Warren Heustis & Son	1 00
CARROTS. — Twelve Long Orange, H. R. Kinney	3 00
Second, E. C. Lewis	2 00
Third, Samuel J. Trepess	1 00
Twelve Intermediate, H. R. Kinney	3 00
Second, E. C. Lewis	2 00
Third, Mrs. Mary T. Goddard	1 00
PARSNIPS. — Four varieties, twelve specimens each, H. R. Kinney	3 00
Second, Warren Heustis & Son	2 00
Third, George D. Moore	1 00
POTATOES. — Four varieties, twelve specimens each, C. H. Thomas,	5 00
Second, Isaac E. Coburn	4 00
Third, Mrs. Mary T. Goddard	3 00
Twelve Clark, Isaac E. Coburn	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, C. H. Thomas	1 00
Twelve Hebron, F. J. Kinney	3 00
Second, Isaac E. Coburn	2 00
Third, H. R. Kinney	1 00
Twelve Rose, Isaac E. Coburn	3 00
Second, H. R. Kinney	2 00
Third, C. H. Thomas	1 00
Twelve Savoy, Isaac E. Coburn	3 00
Second, H. R. Kinney	2 00
Third, Mrs. Mary T. Goddard	1 00
Twelve of any other variety, C. H. Thomas, Carman No. 3	3 00
Second, H. R. Kinney, Carman No. 1	2 00
Third, Mrs. Mary T. Goddard, Notts Victor	1 00
SALSIFY. — Twelve specimens, George D. Moore	3 00
Second, H. R. Kinney	2 00
Third, Warren Heustis & Son	1 00
TURNIPS. — Twelve Flat, F. J. Kinney	2 00
Second, Mrs. Mary T. Goddard	1 00
Twelve Swedish, Henry E. Rich, White	2 00
Second, Henry E. Rich, Skirving's Purple	1 00
ONIONS. — Twelve Danvers, Samuel J. Trepess	3 00
Second, George D. Moore	2 00
Third, Hon. J. J. H. Gregory	1 00

Twelve Red, Hon. J. J. H. Gregory	3 00
Second, W. N. Craig	2 00
SQUASHES. — Three Bay State, Hon. Aaron Low	3 00
Second, Arthur F. Coolidge	2 00
Third, Warren Heustis & Son	1 00
Three Hubbard, Samuel Hartwell	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00
Three Hybrid Turban, Hon. Aaron Low	3 00
Second, E. C. Lewis	2 00
Third, Arthur F. Coolidge	1 00
Three Marblehead, E. C. Lewis	3 00
Second, Joshua C. Stone	2 00
Three Marrow, Warren Heustis & Son	3 00
Second, Arthur F. Coolidge	2 00
Third, Sumner Coolidge	1 00
BRUSSELS SPROUTS. — Half-peck, John Jeffries	3 00
Second, Nathaniel T. Kidder	2 00
Third, Hon. Aaron Low	1 00
CABBAGES. — Three Drumhead, trimmed, Samuel Hartwell	3 00
Second, Oliver R. Robbins	2 00
Third, B. J. De Souza	1 00
Three Red, trimmed, Hon. Aaron Low	3 00
Second, H. R. Kinney	2 00
Third, E. C. Lewis	1 00
Three Savoy, trimmed, Samuel Hartwell	3 00
Second, H. R. Kinney	2 00
Third, E. C. Lewis	1 00
CAULIFLOWERS. — Four specimens, A. M. Knowlton	5 00
Second, William H. Teele	4 00
Third, B. J. De Souza	3 00
Fourth, Henry E. Rich	2 00
CELERY. — Best kept during the exhibition, four roots of Paris Golden, Arthur F. Coolidge	5 00
Second, Warren Heustis & Son	4 00
Third, H. R. Kinney	3 00
Any other variety, Warren Heustis & Son, Pascal	5 00
Second, A. Nixon, White Plume	4 00
Third, H. R. Kinney, Pascal	3 00
ENDIVE. — Four specimens, E. C. Lewis	3 00
Second, H. R. Kinney	2 00
Third, Mrs. M. Haller	1 00
LETTUCE. — Four heads, Calvin A. Hoar	3 00
Second, Sumner Coolidge	2 00
Third, Warren Heustis & Son	1 00
PARSLEY. — Two quarts, Sumner Coolidge	2 00
Second, Arthur F. Coolidge	1 00

HORSERADISH. — Six Roots, H. R. Kinney	2 00
Second, George D. Moore	1 00
CORN. — Yellow or Field, twenty-five ears, Elliott Moore	3 00
Second, Henry E. Rich, Twelve Rowed	2 00
Third, Henry E. Rich, Eight Rowed	1 00
EGG PLANT. — Four Round Purple, Sumner Coolidge	3 00
Second, Arthur F. Coolidge	2 00
Third, George D. Moore	1 00
TOMATOES. — Three varieties, twelve specimens each, E. C. Lewis,	5 00
Second, Hon. Aaron Low, Perfection, Stone, and Cardinal	4 00
Third, Hon. Aaron Low, May's Favorite, Scoville, and Paragon	3 00
Twelve Comrade, Hon. Aaron Low	3 00
Twelve May's Favorite, Isaac E. Coburn	3 00
Second, W. N. Craig	2 00
Twelve Stone, Daniel L. Fisk	3 00
Second, Hon. Aaron Low	2 00
Third, Joseph Thorp	1 00
Twelve of any other variety, Arthur F. Coolidge, Puritan	3 00
Second, Isaac E. Coburn, Ignotum	2 00
Third, Hon. Aaron Low, G. A. R.	1 00
PEPPERS. — Twelve specimens of Squash, George W. Jameson	3 00
Second, George Lincoln	2 00
Third, Arthur F. Coolidge	1 00
Any other variety, Hon. Aaron Low, Bull Nose	3 00
Second, Hon. Aaron Low, Ruby King	2 00
Third, Hon. Aaron Low, Golden Queen	1 00
CULINARY HERBS. — Collection, named, W. N. Craig	5 00
COLLECTION OF VEGETABLES, covering fifty square feet, arranged for effect, H. R. Kinney	15 00
Second, Warren Heustis & Son	12 00
Third, Arthur F. Coolidge	10 00
Fourth, E. C. Lewis	8 00

Gratuities: —

Hon. Aaron Low, Collection of Tomatoes	3 00
Joshua C. Stone, Watermelons	1 00
W. N. Craig, Collection	4 00
John Jeffries, "	2 00
Warren Heustis & Son, "	2 00
P. G. Hanson, "	2 00
A. A. Lawrence, "	2 00
George D. Moore, "	1 00
Mrs. Mary T. Goddard, "	1 00

OCTOBER 10.

Gratuity: —

Warren Heustis & Son, Celery	1 00

OCTOBER 17.

Gratuity: —

Warren Heustis & Son, Celery 1 00

OCTOBER 24.

Gratuities: —

William C. Winter, Tomatoes 1 00

Warren Heustis & Son, Celery 1 00

OCTOBER 31.

Gratuity: —

Warren Heustis & Son, Celery 1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 21.

CUCUMBERS. — Pair, Francis Blake 3 00

Second, John L. Gardner 2 00

CABBAGES. — Three Red, trimmed, Hon. Aaron Low . . . 3 00

Second, Samuel Hartwell 2 00

Three Savoy, trimmed, Joshua C. Stone 3 00

Second, Warren Heustis & Son 2 00

Third, Samuel Hartwell 1 00

BRUSSELS SPROUTS. — Half-peck, John Jeffries 3 00

Second, John L. Gardner 2 00

Third, Hon. Aaron Low 1 00

CAULIFLOWERS. — Four specimens, A. M. Knowlton . . . 3 00

Second, William H. Teele 2 00

Third, B. J. De Souza 1 00

CELERY. — Four roots, Warren Heustis & Son, Pascal . . . 3 00

Second, Warren Heustis & Son, Paris Golden 2 00

Third, Warren Heustis & Son, Boston Market 1 00

LETTUCE. — Four heads, Joshua C. Stone 3 00

Second, George D. Moore 2 00

Third, Warren Heustis & Son 1 00

TOMATOES. — Twelve specimens, grown under glass, William C. Winter, Stone 3 00

Second, William C. Winter, Perfection 2 00

Third, Francis Blake 1 00

Gratuities: —

Warren Heustis & Son, Collection 3 00

Elisha S. Converse, Mushrooms 1 00

DECEMBER 5.

Gratuities: —

Warren Heustis & Son, Lettuce 1 00

Hon. Aaron Low, Spinach and Brussels Sprouts 1 00

REPORT

OF THE

COMMITTEE ON GARDENS,

FOR THE YEAR 1896.

By JOHN G. BARKER, CHAIRMAN.

The Committee take pleasure in reporting to the Society a season of unusual activity and interest, the prizes offered having been competed for more than in any previous season. In all, we have made eleven visits, and on each occasion the subjects for competition were of unusual merit, and we feel that the purpose for which the Committee is established has been more satisfactorily carried out than in previous seasons. We are glad to report that Mr. David Nevins has entered his fine estate at Framingham for the H. H. Hunnewell Triennial Premium, and that Mrs. Benjamin P. Cheney has also entered her estate at South Natick for the same Premium. We expect to make the first visit at Mrs. Cheney's place in June, 1897.

Your attention is invited to the statements of the various competitors, which are of practical value.

DAVID NEVINS'S ESTATE, FRAMINGHAM.

The Committee have made two visits to the fine estate of Mr. David Nevins, at Framingham. The large extent of the estate and the varied fine views lend to it a charm and attraction not easily described. To appreciate its beauty it must be seen; there is no spot anywhere that has not some attraction. As we enter the estate from Framingham, a portion on the borders of Farm Pond

is laid out with well-planned drives. Here no attempt has been made at artificial treatment, but the native trees have been well cared for, and the grounds kept clean, and with the exception of a few evergreens that have been planted there, it is as near a natural park as can well be. It is a pleasant spot of about 150 acres, and is a fine example of what can be done with a natural piece of woodland where a small amount is laid out to make it accessible for pedestrians and carriage driving. We believe this is open to the public, who enjoy it at their will. Leaving this place, we approach the estate proper, which is reached by a driveway, the borders of which are planted with groups and single specimens of evergreens in well selected varieties. After crossing the county road we enter that part of the estate occupied by the mansion-house, gardens, farm barn, and stables. We find the kitchen-garden well arranged, with a good variety of vegetables and small fruits, all in the highest state of cultivation. There is a small amount of glass structures and cold frames, which are invaluable on an estate of this size. After a highly satisfactory inspection of this department, we retrace our steps to the long drive leading to the mansion-house. Between this drive and the county road there is no fence, but an irregular border of shrubs and evergreen trees of many interesting varieties planted in groups. On the left a large planting of shrubs, in variety, divides the lawn from the meadow, two hundred or more feet from the house, which stands on the highest elevation of the estate. On the east side a large parterre is laid out between the mansion-house and a stone wall not far from the highway, the border in front of the wall being planted with low-growing evergreens. The arrangement of the parterre gives a pleasing approach to the house. On the opposite side of the house the grass grade slopes gradually to the Sudbury River. The stable, at a convenient distance from the house, is hidden by a belt of trees in a very healthy condition. A continuation of the drive to the westerly end of the estate takes us where the extended views are the charm and admiration of all. They are certainly not excelled in New England, and it is doubtful whether they are in old England. In the distance Mount Wachusett is plainly visible, and the beauty and variety of hill and dale with the fine water front can hardly be excelled. We are again attracted by the excellent specimens of evergreens in the border between the estate and the

highway. Particularly noticeable are elegant specimens of *Abies concolor, A. Douglasii, A. orientalis, A. Nordmanniana*, and *Picea pungens* of good form and rich coloring. A commendable feature, especially in the case of the trees, is that they have not been allowed to grow so closely together as to spoil each other, but much time and labor are bestowed every year in pruning and thinning out the trees and shrubs. Every effort is made to grow good specimens of the rarer and choicer varieties of evergreens, which in the near future will be a splendid feature of the place. Perhaps the most enjoyable spot is the piazza of the house, where the most varied and extended views are obtained. In the distance, looking in one direction, we see a train of cars wending its way through meadow and woods; in another direction we see cattle grazing in the distance — here a stretch of meadow, and again large tracts of woodland and meadow, all beyond the water front. Nearer, or between the house and the water front, small groups of trees and single specimens have been planted which even now, while yet young, add much to the charm and attractiveness of the landscape, and when they shall have attained a full growth the beauty of the views will be greatly enhanced. In the care and development of the estate much credit is due for the good condition of everything to the faithful and persistent labors of Alexander McKay, Mr. Nevins's gardener, who is deeply interested in the development of the estate; we wish we could record more such instances of confidence between employer and employee. Your Committee are unanimous in their conclusion that this estate is one of the finest we have visited in point of natural views and unexcelled scenery. The judicious manner in which it is managed and developed has assisted in bringing us to this conclusion. We also desire to record our hearty appreciation of the very cordial reception given us personally by Mr. Nevins. His statement in regard to his estate is as follows:

Statement of Mr. Nevins.

Framingham, September, 1896.

I made my first purchase of land here in the spring of 1871. The farm consisted of one hundred and fifty-six acres, lying on both sides of the Sudbury River, and bounded on the south for nearly a mile by the Boston and Albany Railroad, and on the

east by Farm Pond. My first work was the taking away of all division walls, getting rid of old and worthless apple orchards, etc. Within a short time the City of Boston seized the Sudbury River, beginning the series of flowage dams, which in the case of my farm on Basin No. 2, has given us a very extensive water view. Within ten years of my first purchase, from neighbors moving away, etc., I had added a large area to the original place, the estate now consisting of nearly five hundred acres. The pasture, about a hundred and fifty acres, west of the river, is fenced; other than this there are no walls or fences on the place, or on the county road running through the farm, ornamental trees and shrubs proving a handsome and sufficient division line.

In 1888, to avail of the better site and extensive views, I moved my house and stable about seventeen hundred feet in distance, directly north of the old location; the new avenue, planting plans, grading, etc., having been laid out and superintended by Mr. Ernest W. Bowditch, landscape engineer and gardener. There is a drive around the entire place, furnishing easy and pleasant communication with all the fields, but the grounds about the house, with the lawns, ornamental planting, kitchen-garden, and main avenue comprise about seventy-five acres. The farm buildings, including the modern three-story barn, are at the extreme southerly end of this part of the estate, and near by is the garden, of a little over two acres, including a moderate amount of glass; and here my gardener, Alexander McKay, has raised the roses, violets, etc., which I have exhibited at the Society's shows, taking many first premiums. I append a report [1] from Mr. McKay on his method of raising violets in frames. Your Committee awarded him their first prize of $40 for these violets last spring.

Very truly, DAVID NEVINS.

To JOHN G. BARKER, ESQ.,
Chairman Committee on Gardens.

[1] See page 293.

CHRYSANTHEMUMS.

The interest in the cultivation of the Chrysanthemum seems to be as general, and the growers as enthusiastic, as ever. Your Committee feel justified in continuing these prizes for chrysanthemums, especially as ornamental plants. We have thought that each season has brought better and better plants, but there is no room for doubt that the plants at Mrs. Cheney's and at Mr. Walter Hunnewell's were the best your Committee have seen.

Mrs. Benjamin P. Cheney's Chrysanthemums, South Natick.

We had two competitors for the best house of Chrysanthemums, arranged for effect with other plants. Our first visit was at Mrs. Benjamin P. Cheney's (John Barr, gardener). Here we found a very choice lot of medium sized, well grown plants, forty-two in number, and each one a perfect specimen. They were propagated in January and shifted on to twelve-inch pots, and grown under glass all summer, on side benches, until the latter part of August, when they were moved to the house in which they were flowered. Mr. Barr says that in growing specimens one must try for varieties that are short-jointed, so as to be kept compact, and must also look out for pleasing colors; so we have to go back and grow old varieties to get those points, as it is usually hazardous to depend on the new. They take up a great deal of room if you intend doing them well, and require a great deal of air to keep the foliage; but, as a whole, Mr. Barr says he would rather grow a house of specimen bush plants than a house of plants with single stems, and, on a private place, the proprietor enjoys them more.

Mr. Barr further says that the great point in growing specimens is to keep the soil sweet, and not overdose with fertilizers, but give a little at a time and often.

Mr. Barr's list includes the following varieties, and he says that any of them will make nice plants with a little care:

White. — Ivory, Theo, Mme. A. Planchon, Mrs. Heale, Silver Cloud, Vernal Fall, Mrs. Robert Craig, Mutual Friend, Jennie Williams.

Yellow. — President Hyde, Gold Dust, Whilden, W. H. Lincoln, Mrs. Bishop, W. H. Rieman, Savannah, Georgiana Bramhall, Primula, Jardin des Plantes, C. Chalfant, Minerva.

PINK. — Pink Ivory, Nemesis, Mons. R. Dean, Iora, Zulinda, L. Boehmer, Mrs. Perrin, Eda Prass, Mrs. S. T. Murdock, Erminilda, Portia, Mrs. Goschen, Duchess of York.

RED. — William Seward, John Shrimpton, Sunrise, Columbine, Golden Hair, Cullingfordii, Mrs. E. M. Bigelow, Emma O. Farel.

The house in which these plants were grown is span-roofed, 50 × 20 feet, arranged for this occasion with a walk through the centre of the house, on the bench, with the plants on either side, so that visitors could look on all at one time. The plants were what may be termed medium in size, but were very uniform, and both flowers and foliage were in the most perfect condition, arranged with excellent taste as to color blending, harmonizing beautifully with the foliage plants, which were not so numerous or so large as to detract from the Chrysanthemums. It was well done, and was in every way a fine show.

In the house of Chrysanthemums on benches, there were eight hundred plants grown to one stem and bloom, which were propagated May 1st, and planted the second week in June, nine inches apart, on benches. There were thirty-six varieties, grown mostly for exhibition, with not two dozen blossoms lost out of the entire lot. Of new varieties Mr. Barr says he cannot say much, and finds it generally impossible to say much about them the first year. The stock, he finds, is generally all run out; it is forced to death, so that sometimes they surprise one the second year. Mrs. Perrin and Modesto are varieties that will make names for themselves Gretchen Buettner is a good white. Violescent and Indiana have long necks, which is against them, but Violescent makes a nice flower. William Simpson is a good, clear pink, but there is not enough to it to make it a good staying variety. Mr. Barr says the trouble on a private place is to make room for Chrysanthemums. This year he potted his pinks in six-inch pots; now, as the Chrysanthemums are used, he cleans out the benches and plants the pinks. The benches are made of such a size that six men can carry out a section filled with loam; and in spring, when the time comes to plant Chrysanthemums, the benches of pinks are carried out, and benches with fresh soil are carried in for the Chrysanthemums. In this way the pinks are all saved, and the Chrysanthemums are not delayed.

Walter Hunnewell's Chrysanthemums, Wellesley.

Our next visit was at Walter Hunnewell's (T. D. Hatfield, gardener), where we saw some very fine specimens indeed. At our request Mr. Hatfield has given us for the Transactions a leaf out of the book of his own experience, which has extended over many years, he having been a successful grower and exhibitor for a long time. The many premiums he has received must be a sufficient evidence that he is an expert in the culture of this popular plant. During this same time he has furnished articles and notes on the Chrysanthemum for "Garden and Forest." Mr. Hatfield's account forms a valuable contribution to the Transactions of the Society, and will be read with interest.

He writes as follows:

Statement of Mr. Hatfield.

During the season large numbers of small pot Chrysanthemums are bought when in bloom. What to do with the plants when out of bloom is a question often asked. When it is remembered that Pompon varieties are quite hardy in Massachusetts, and many others nearly so, it will be seen that no pampering is necessary in wintering the plants over. Such as have been grown in pots are by the nature of their previous culture too tender to be turned out at once. A very cool cellar, such as a barn cellar, on a shelf near the light, would be a good place to keep them. A little frost would do them no harm. It is better to keep the plants cool, for if the place is at all warm they start into growth, and this weakens them. I have known them keep well in an attic, and also in a fairly warm cobbler's shop, near the windows. They freeze sometimes, but come out all right in spring. Here is a starting point. When spring comes most of the plants will be a mass of growing shoots. What is generally done is to divide up the old stool, and plant a number of shoots together. I do not desire to be tedious, or to hamper the grower with too many details, but it would be better if a few of the shoots, with a piece of root attached to each, could be started afresh into separate plants in sandy soil. This could all be done before June, after which there would be ample time to transplant the young plants and get good bushes before the autumn. Young plants such as I have indicated always have more vigor than

detached portions of the old stock. During the months of June and July, when the plants are growing fast, they should be frequently topped to induce stocky growth. Some localities are much infested with insects, which often blight the shoots so badly that few flower buds appear. A good plan in such cases is to place a frame work of mosquito netting about the plants, with an opening on one side. This will keep out their worst enemy, the chinch bug. Green and black aphides — small insects which cling to the leaves and buds near the ends of the shoots — often gather in such large numbers as to cripple the shoots seriously. The frequent application of tobacco dust will keep them in check. The plants should be taken up early in September, potted carefully, and stood in some shady place to recover. As cold weather comes they should be housed at night and stood out during the day time.

The large flowers we see on trained specimens are obtained by reducing the number of buds on a shoot to one only. More flowers, but smaller, would naturally come were all the buds allowed to remain. It is just a matter of taste. Small plants of all the leading varieties are offered by the principal florists in spring time. The newest are not always the best. Here is my selection for next season: Morning Crow, pink; Mutual Friend, white; O. W. Holmes, red; Marion Henderson, yellow; Norma, pink; Ivory, white; Columbine, bronze; Garza, white anemone; Savannah, yellow pompon; John Shrimpton, crimson; W. H. Lincoln, yellow; Joseph H. White, white.

This statement was written at the request of the Chairman of the Garden Committee, especially for amateurs and schools. It is in no sense a professional article.

T. D. Hatfield.

William Nicholson's Chrysanthemums, Framingham.

For Chrysanthemums on benches the other applicant was Mr. William Nicholson, whose plants were grown for commercial purposes, on a bench in the centre of a house 15 × 100 feet, and formed a very satisfactory exhibit indeed. We have requested some notes from Mr. Nicholson, and he says: "In regard to Chrysanthemums for 1896 I think quite a little progress has been made — that is, in separating the kinds for exhibition blooms and those for commercial purposes. Mine are all grown

for the latter purpose, therefore I have to discard a good many varieties that make very fine exhibition blooms, and give you the following list of what I think are the best market kinds to date:

"WHITE. — Mrs. Bergmann, Ivory, Mrs. H. Robinson, W. G. Newett, Mrs. Phipps, Mrs. Jerome Jones, Minnie Wanamaker, Niveus, Pelican.

"YELLOW. — Yellow Queen, Major Bonnafon, Gold Lode, W. H. Lincoln, H. W. Rieman, President Hyde for a pot plant.

"RED. — John Shrimpton and Cullingfordii. John Shrimpton is good for single stems and pot culture as well.

"PINK. — M. Neval, Mrs. Perrin, Helen Bloodgood, Mrs. S. T. Murdock, Erminilda, Maud Dean, Ada Spaulding, Ruth Ellis.

"BRONZE. — Sundew, Harry May, E. G. Hill.

"The plants were propagated from May to the 20th of June, and planted on the benches from the 15th to the 25th of July, in compost the same as last year.

"This year in feeding I used considerable imported English bituminous soot and consider it very valuable in keeping the foliage in good condition."

The fine condition of the plants was the best evidence of good cultivation; two flowers were grown on each plant, each abundantly large enough for all commercial purposes. An experienced florist who accompanied us on this visit said that it was as good a house as he ever saw, and that the moderate sized flowers, of which these were so fine samples, would find a much more ready market than the larger ones.

CHRYSANTHEMUMS AT OAKMONT, LEXINGTON.

By JAMES COMLEY.

Chrysanthemums are largely grown at Oakmont, many new varieties being obtained each season, a list of which, with their descriptions, is given for the benefit of those who may wish to add to their collections.

Adelaide. — Japanese. Deep rose pink; reverse, shell pink.

Autumn Bride. — Japanese, 1896. First exhibited as October Queen. Pure white, incurved, fine, early.

Buff Globe. — Japanese Incurved. A buff yellow sport from Good Gracious.

Buff Harry. — Incurved. Deep brownish yellow shaded buff; petals covered with glandular hairs.

Clarence. — Incurved. Bright red, golden reverse.

Columbine. — Japanese Incurved. Bright red, reverse bronze.

Daydawn. — Japanese. Creamy white, centre tinged sulphur; large, early.

Golden Sunset. — Japanese Incurved. Broad petals covered with glandular hairs; deep old gold.

Headlight. — Japanese Incurved. Deep carmine, reverse silvery pink.

Indiana. — One of the largest flowers to be found in the family, measuring twenty-two inches in circumference, nicely incurved; of a clear bright pink within, lighter color without.

Invincible. — Japanese. White, very large.

Jessie Whitcombe. — Japanese. Deep golden yellow, of immense size, and perfect form.

J. R. Keim. — Bright golden yellow, striped red.

Liberty. — Late; clear rich golden yellow.

Mrs. C. B. Freeman. — Clear yellow; a hirsute variety, being a sport from L. Boehmer.

Mrs. Battles. — Probably the same as Mrs. H. H. Battles.

Mrs. Helen Wright. — Pure ivory white, with age assuming the faintest tint of pink.

Mrs. H. H. Battles. — Japanese Incurved. Large, late, white shading blush at base.

Mrs. Perrin. — The rose pink Ivory; rose pink within, glistening pink without.

Mrs. R. Crawford. — Extra large, clear white, resembling Ivory, but larger; late.

Mrs. T. D. Hatfield. — Incurved. Pure yellow, fine form, high centre.

Mrs. W. W. Raynor. — Japanese. Beautiful clear white, early to mid-season.

Marion Cleveland. — Very large, early, ivory white, shaded delicate lemon at centre.

Midnight. — Crimson lake; very hairy.

New York. — Japanese Incurved. White; globular and massive.

Nanshon. — Japanese. White; globular; mid-season.

Phryne. — High rounded Japanese flowers; inner surface rich red bronze; reverse, bright chrome.

Pride of Castlewood. — Chinese; pure white.

Red Warrior. — Reflexed. Chestnut red, in the style of W. W. Coles.

Rena Dula. — Incurved Japanese. Deep rich pink.

Riverside. — Reflexed. Deep canary yellow; broad flat petals.

Signal Light. — Incurved Japanese. Red bronze.

Sibyl Kaye. — Japanese. Salmon pink; reverse, clear yellow.

The World. — Japanese. Very large flat flowers, with incurving petals, pure white.

Tippecanoe. — Japanese Incurved. Terra cotta, with lighter reverse; a fine exhibition flower.

Violet King. — Japanese. Pink shaded violet.

W. Matthews. — This must be the same as Governor Matthews. Pale pink, turning to white.

VIOLETS.

It is always the object of the Committee to offer new prizes as occasion requires, to encourage the good cultivation of any special subject. In accordance with this principle a prize was offered this year for the best bench or frames of violets, which are in such demand during the winter months that a stimulus to good cultivation is a public benefit. The violet disease has been very troublesome to many growers, and a few abstracts from the pens of experienced cultivators may not be out of place. Under the head of "Garden Notes," "Garden and Forest," for 1893, page 337, we read: "If we want strong clumps of violets to bloom well in winter, we must cut off the runners now (August 9), and not wait for the violet disease to show itself before remedies can be applied. We hope to ward off a possible attack of disease by the application of fungicides now. We have two batches, and one is given an application of sulphide of potassium at the rate of half an ounce to a gallon of water, the other a dusting of 'Grape dust' in twenty parts of air-slacked lime." On page 367 of the same volume, E. O. Orpet says, August 30: "Our first preparation for fall is to get the violets under glass as soon as practicable, and at this time every plant of the winter-flowering double kind, Lady Hume Campbell, is safely under glass, either in the frames or the heated house. The showery weather, and consequent humid atmosphere, give the exact conditions favorable to the development of disease, traces of which are already visible. This

removal of plants enables us to keep off overhead moisture. I have tried every known means to circumvent the disease, but have come to the conclusion that there is no cure for diseased plants in an advanced stage, and it is a waste of time and labor to try remedies. Much can be done, however, to keep healthy stock from becoming weak, by taking off all the runners at this season."

The paper of Mr. Alexander McKay, gardener to David Nevins, who has been a successful grower and exhibitor of violets for several years, which is appended, will be read with interest; the frames placed in competition for the prize were well grown; indeed, they were the best your Committee have seen.

Violet Culture in Frames.

The method of cultivation pursued is very simple, and differs in detail but slightly from that in general practice. Cuttings from the strongest runners are obtained at various times during the winter, being taken from the healthiest and most vigorous plants. They are trimmed and planted in boxes of sandy soil, and kept in the greenhouse until well rooted and growing vigorously. They are then transferred to the cold frames, where they remain until planted in the field.

A position where the plants will be shaded part of the day is chosen for their summer growth. A heavy coat of fine manure is given, spread on evenly.

Planting is done early in May, setting in rows eighteen inches apart each way. Hoeing to keep the weeds down and the soil loose, and pulling off useless runners as they appear, are strictly attended to during the growing season.

About the 20th of September the best plants are lifted and planted in frames, space enough being left between the plants to allow a free circulation of air. When planted they are thoroughly watered, and the sashes, lightly shaded, are put on. Air is freely given day and night as long as mild weather continues. When freezing weather arrives they are covered nightly with mats and shutters. Watering is performed with extra care from November to the end of March, being confined to parts showing dry on the surface.

The soil used is composed of three parts of loam and one part of old hotbed manure, with the addition of a light sprinkling of

wood ashes. This is composted a year previous to using, and turned over at intervals to insure an intimate mixing of the ingredients.

Respectfully yours,

ALEX. McKAY,
Gardener for David Nevins.

To J. G. BARKER, ESQ.

JAMES COMLEY'S VIOLETS

Were grown in a frame forty feet long by six feet wide, and were the California variety. The cuttings were placed in a cold frame June 1, well watered and kept shaded for ten days; then exposed to the sun, and kept well watered until September 1, when they were planted in the frame. They are now in a compost of one part good old cow manure and one of yellow loam, with a little ground bone dust, and are given plenty of air every fine day. The growth was vigorous and free from disease, and the flowers were produced in abundance.

CARNATIONS

Are so deservedly popular that your Committee thought it wise to offer a premium for the best house. There has not been the competition we expected, but we have seen enough under cultivation to satisfy us that the encouragement which the premium offers is a step in the progressive line of Floriculture. The Carnation is and always will be popular, especially for winter cut flowers, their keeping qualities being so excellent. There is but little that can be added to the many articles on Carnation culture in the popular horticultural journals and the Proceedings of the American Carnation Society. William Nicholson, who made the only entry, sends the following notes:

"In regard to Carnations I have very little to say at present. On account of the dry weather my plants will be quite small to take in, but they are very nice, clean, and healthy. I have a few of the new varieties on trial. Edith Foster, white, is a very promising one, and Eldorado, yellow, which I had last year, I consider one of the very best sent out. I have two or three very promising seedlings of my own, but cannot tell how they will turn out until after another year's trial. There are lots of new

seedlings sent out every year, but very few of them reach the top of the ladder, as the standard is getting very high, and they must be exceptionally good to make a mark for themselves."

Mr. Nicholson's houses were in excellent condition; the plants very healthy, with no sign of disease. High cultivation and cleanliness are the features that characterize all that Mr. Nicholson takes hold of, and his well-merited success is due to his care and skill.

FRUIT GARDEN.

The only application for this premium for the best Fruit Garden was from Mr. Warren H. Heustis, and was made with particular reference to his Strawberry Garden, which contains about one acre. The varieties grown are principally the Marshall and Belmont. The latter variety, Mr. Heustis says, is no back number with him by any means, as it holds it own for productiveness and for price in the Boston market. The plants are set in rows four feet apart and two feet in the row, and allowed to make a bed. A path a foot wide is cut out in the spring, and the plants are thinned out where they are too thick. The Marshall, Mr. Heustis finds, has many plants with no berries set on them, but he says these barren plants will fruit another year. The condition and productiveness of this acre of strawberries were the best evidence of good cultivation; it was quite equal to any acre of strawberries we have seen.

In addition to making a specialty of strawberries, Mr. Heustis is gradually getting into other fruits, — pears, apples, gooseberries, and currants, — and says that it takes the best of land for these purposes, which is a soil bordering on clay. On such a soil the fruit comes very smooth and fair, with scarcely any disease. There are about one hundred and seventy-five young pear trees, divided between Bartlett, Bosc, and Dana's Hovey. Among apples the Gravenstein is considered the best all-around apple for early autumn. We hope to have the pleasure of recording Mr. Heustis's success with his fruit trees at a future time.

VEGETABLE GARDENS.

The competitors for this prize were Col. Frederick Mason, of the Riverside Farm, Taunton (E. C. Lewis, manager), and Warren Heustis & Son, of Belmont. Both these gentlemen have furnished statements, which follow:

STATEMENT OF E. C. LEWIS.

TAUNTON, MASS., Sept. 19, 1896.

JOHN G. BARKER, ESQ.:

Dear Sir: In reply to your inquiry in regard to the crops we grow, mode of cultivation, etc., I would say that the farm consists of fifty acres of cleared land; namely, ten acres of river meadow with clay subsoil, nearly all of which has been mowed twice this season, and forty acres of upland sandy loam soil with part clay subsoil and part coarse sand or gravelly subsoil.

Thirty acres are down to English grass, which has been cut twice this season.

We use Canada hard-wood ashes for our grass land, applying at the rate of one ton per acre each year in the fall months, and one hundred pounds of nitrate of soda per acre in the spring.

When we re-seed or seed down we use about five hundred pounds of ground bone per acre in addition to ashes. We keep a small herd of Jerseys, consisting of seven cows and one bull, which are fed during the summer months, from April to the end of October, on rye, oats, and peas; oats and vetches, or tares, sweet corn fodder, etc., of which we usually take two or three crops from the same land, five or six acres of land being used for that purpose, and some of the fodder being cured for winter use.

We have about five acres of land planted to roots and vegetables, consisting of one acre of mangolds and sugar beets, the land for which was manured with stable manure at the rate of eight cords per acre and eight hundred pounds of Armour's Soluble Fertilizer, all applied broadcast and worked in thoroughly with a wheel harrow, after which we used a Thomas smoothing harrow and then rolled down the land with a light roller. The seed was planted in rows two feet apart, at the rate of about six pounds per acre. We commenced cultivating as soon as the beets got up two inches, and thinned them when six inches high with a common hoe, leaving them from twelve to fifteen inches apart. We estimate the crop as it now stands at from forty to forty-five tons on the acre.

The remainder of the five acres of land is planted to potatoes, squashes, and about one hundred other varieties of vegetables, nearly all of which are planted so as to use a pony and cultivator

between drills. We have water laid on about three acres, supplied by a windmill.

The farm is owned by Col. Frederick Mason.

Warren H. Heustis's Vegetable Garden.

Mr. John G. Barker, *Chairman Garden Committee:*

The Vegetable Garden entered by me contains about twelve acres, consisting of light, low, and soil bordering on the clay. The farm is devoted to a general assortment of garden crops, namely: parsley, carrots, lettuce, onions, spinach, dandelions, cucumbers, cabbages, beans (string and shell), salsify, squashes, melons, corn, rhubarb, and celery. We grow about three hundred thousand celery plants, divided about equally between Paris Golden and Giant Pascal, with a few thousand Boston Market. The early celery is set two feet by four and one-half inches and lettuce or spinach is sown between the rows; for later we set four feet by four and one-half inches. Lettuce is sown every week, using Black Seeded Tennis Ball altogether. For parsley we use the Double Curled; carrots, the Intermediate; onions, the Danvers; spinach, the Round Thick Leafed and the Pointed Leafed; dandelions, the Improved Thick Leafed. Of cucumbers we have the White Spine, and use about five hundred hotbed sashes. Of cabbages we have this year about ten thousand, equally divided between All Seasons, All Head, and Number Two. Of beans we have the Golden Wax and Goddard. The cabbages, cucumbers, and in fact all the crops where it is possible, are succeeded by celery. We use no commercial fertilizers whatever, having an abundance of manure from about twelve hundred pigs. For irrigation we use a sixteen-foot Eclipse windmill and a Blake steam-pump.

Warren H. Heustis.

Bussey Institution, Jamaica Plain.

On the 21st of March the Committee visited the greenhouse of the Bussey Institution to see the hardy shrubs and herbaceous plants, forced by the skilful gardener, Charles Jackson Dawson, whose interesting statement follows:

BUSSEY INSTITUTION OF HARVARD UNIVERSITY,

JAMAICA PLAIN, MASS.

DEAR MR. BARKER:

Referring to yours of August 12 I would say I should be pleased to give you a brief account of the greenhouse your Committee visited on the 21st of March, 1896.

With a few exceptions, the house (which is sixty-five feet long by twenty feet wide) contained nothing but hardy plants, which were forced out of season. The house was an object lesson as to what can be forced with little difficulty, the time taken for bringing the various sorts into bloom varying from ten days to ten weeks. Our method is to store all the material that is to be bloomed in cold pits and frames as soon as the frost appears in autumn, and leave them there at any rate until the turn of the year, January 1st, but more generally until February 1st.

The plants are brought in by instalments, the time depending entirely upon how early or late the plants naturally bloom out of doors. For instance, *Kalmia latifolia*, which here blooms outdoors about the middle of June, must be brought into a moderate heat about the first of January. On the other hand, with *Erica carnea*, which is one of the earliest spring-blooming shrubs, it is only necessary to allow about ten days at this season in order to bring it into bloom.

It might be well to arrange the plants thus brought into bloom in three classes, viz.: Shrubs, Herbaceous Plants, and Hardy Bulbs.

Amongst the Evergreen Shrubs the most satisfactory were:

**Andromeda floribunda.*	*Erica carnea*, in variety.
" *Japonica.*	*Genista Germanica.*
" *polifolia.*	**Kalmia glauca.*
* " *speciosa.*	* " *latifolia.*
Berberis Aquifolium.	*Ledum latifolium.*
**Daphne Cneorum.*	*Leucothoë Catesbœi.*

**Rhododendron Catawbiense* hyb., the tender sorts being the most satisfactory for forcing.

The Deciduous Shrubs that were forced are numerous, so I will only mention the most satisfactory:

**Azalea*, Ghent Hybrids.
* " *mollis.*
**Cercis Japonica.*
**Cytisus scoparius.*
**Deutzia gracilis.*
Exochorda grandiflora.
Lonicera tatarica.
**Prunus cerasus fl. pl.*
**Pyrus spectabilis fl. pl.*
Rhododendron Rhodora.
Ribes aureum.
Rosa multiflora.
Rosa multiflora, the Dawson.
Spiræa aryuta.
" *Thunbergii.*
* " *Vanhouttei.*
**Staphylea colchica.*
Syringa Chinensis.
* " *vulgaris* Charles the Tenth.
* " " Marie Lagrange.
**Viburnum opulus.*
" *plicatum.*

You will notice that I have marked the most desirable shrubs with a star (*).

The Herbaceous Plants that were in bloom at the time were few. The noteworthy were:

Astilbe (*Spiræa*) *Japonica.*
" " " *multiflora compacta.*
Cypripedium acaule.
" *spectabile.*
Dicentra spectabilis.
Phlox subulata, in varieties.
Polygonatum giganteum.
Primulas.
Spiræa aruncus.
Viola palmata var. *cucullata.*
" *pedata.*

I cannot pass the Cypripediums without calling special attention to these two beautiful native Orchids. Their forcing qualities are grand, the results being more than satisfactory, and I really considered some pans of *Cypripedium spectabile* the most beautiful plants in our range of houses at the time.

The promiscuous display of Spring Flowering Bulbs scattered throughout the Flowering Shrubs helped to make the house one blaze of bloom. They consisted of:

Dutch Hyacinths.
Tulips.
Hardy Narcissuses.
Erythroniums.
Lily of the Valley.
Italian Anemones.
Arisæma triphyllum.
Camassia esculenta.
Iris Persica.
Lilium Harrisii.
" *longiflorum.*
" *umbellatum.*
Muscari botryoides.
" " *alba.*

And others, all in great variety.

The above-mentioned plants, with the exception of a few Ericas, Acacias, Indian Azaleas, and Genistas, made up the contents of the house, showing what a complete and satisfactory show can be made during the winter with our beautiful hardy spring-flowering plants, both native and foreign.

To set forth in detail the many points necessary to bring this class of plants to the proper stage would encroach too much upon your time.

Hoping this will prove what you desire,

I remain very sincerely,

CHARLES JACKSON DAWSON.

AUGUST 28, 1896.

CAMELLIA HOUSE ON THE ESTATE OF THE LATE FRANCIS B. HAYES, OAKMONT, LEXINGTON.

Not since the days of Hovey and Wilder has this once popular flower been grown to the perfection in which it is now seen at Oakmont; indeed at the places mentioned, although there were fine collections, it was not cultivated to the extent that it is here. Many of the plants here were from Mr. Wilder's collection. It is true that the Camellia is not the popular florist's flower that it once was; still it is altogether too useful to be discarded. If the rose has supplanted it in a great measure, for certain decorative purposes it is superior to the rose. One of the reasons it succeeds so admirably here is the fact that the plants are grown in a bed specially prepared for them. This bed is thirty feet square, and a few are grown in pots. The bed has been planted nine years; the largest plant in the house stands twelve feet high and ten feet through; the trunk is eighteen inches in circumference. This plant has produced the present season more than a thousand flowers and buds. The collection comprises fifty-nine varieties. The varieties planted out are:

Alba plena (the old Double White). — Flowers pure white; large, full; petals round, evenly and regularly arranged; form perfect.

Armida Nova.

Candidissima. — Late blooming, double white; a very compact grower; the plants have a shapely appearance, and flower very freely.

Charles Downing.

C. H. Hovey. — Flowers dark velvety crimson; petals round and symmetrical, imbricated; habit vigorous; foliage rich and ample.

C. M. Hovey. — Flowers scarlet crimson, large and regular in outline; petals finely formed and of great substance; growth vigorous; habit fine.

Countess of Orkney. — Flowers white, often flaked with crimson; of medium size, full, cupped; petals slightly incurved in the early stages of the flower, round, even, and regular; foliage fine.

Dunlap's White.

Fanny Bolis.

Fimbriata. — Flowers white, large, full, flattish; the petals are evenly and regularly arranged, the edges finely serrated so as to give them a fringed appearance. It is a variety of *alba plena*, but less vigorous.

Imbricata. — Flowers large, perfectly round; cherry red, shaded with carmine lake; regularly imbricated; remains a long time in bloom.

Madame Louis Van Houtte. — A sport from Jenny Lind. Of vigorous growth and exceedingly floriferous. Flower of good size; rich rose, shaded and faintly reticulated with clear carmine and bordered with pale rose.

Mrs. Abby Wilder. — Flowers white, occasionally faintly shaded with flesh color and striped with lake; of medium size, full, imbricated, perfect in form; foliage and habit good.

Mrs. Cope. — Flowers blush, flaked and dashed with carmine; of medium size, full, cupped; petals rounded, even, and regular; habit good.

Pœoniflora.

President Clark.

Reine des Beautés. — Flowers pale flesh color, occasionally tinged or striped with rose; of medium size, full, flattish; petals round; foliage and habit fine.

Sacco. — Light rose; a very free flowering variety.

Sarah Frost. — Flowers deep rosy pink, sometimes rayed with white; large, full, flattish; petals round, even, and regular; habit good.

Wilderi. — Delicate clear rose; of the most perfect rose shape, retaining its beauty a long time. Originated by the late Hon.

Marshall P. Wilder, and first exhibited at the rooms of the Massachusetts Horticultural Society, February 14, 1846.

The splendid condition of the plants was ample proof that the best mode of cultivation had been adopted; it is doubtful whether another such collection can be found — certainly not in this vicinity. A writer in the "Encyclopædia Britannica," whose name is not given, says: "To be seen in their full perfection Camellias should be planted out in borders of properly prepared soil under glass, but these borders should be very effectually drained, and of such a mechanical composition as never to become soddened, for the plants require to be almost deluged with water when making their growth and when developing their blossoms. The borders, moreover, when the plants have become well established and the soil full of roots, will require to be assisted by top dressings and by applications of liquid manure. They by no means require a heated structure, nor too much sunlight, but when well established in a cool and somewhat shaded conservatory, may become a source of infinite delight to those who have a love for flowers."

William Nicholson's House of Forced Tomatoes, at Framingham.

Mr. Nicholson writes:

"In regard to my house of Tomatoes, they were sown in boxes in October, afterwards transplanted into flats, and again transferred into six-inch pots, and were planted on benches the middle of December, after my chrysanthemums were all cut, in the same loam that the chrysanthemums were grown in, which was well fertilized with Jeffard's animal fertilizer. We also top-dressed them with it about once in two weeks when they began to bear, and fed them with liquid manure. We began to pick the fruit in March, and there was quite a crop on them when we pulled them out on the 15th of July. We cut about four thousand pounds from this house, fifteen by one hundred feet, and were troubled very little by club-root this year. I think it is on account of using a good quantity of lime. I find that limewater is a very good thing for club-root in roses also."

The following article, taken from the "Florists' Exchange," September 5, 1896, is reproduced here as of value to all who are engaged in this industry:

Winter Forcing of Tomatoes.

Preparations for this work should now be well under way, and if the tomato seed is not already sown no time should be lost in doing so, for every day is of value now. The seed needs to be sown in a light soil, and just as soon as the plants are large enough to handle pot them up, singly, in two-inch pots, using a nice light liberal soil. Grow the plants on carefully and avoid drawing or coddling them, but make a point of keeping them stocky yet not starved. It is essential to their welfare that they never suffer from any kind of neglect. Immediately the roots spread all through the soil, pot up into, say, a four-inch pot, using a more retentive soil, which should consist of good sound loam and short, well-rotted manure. Attend carefully to the watering and keep the plants moving lively, but not forced. Then, as soon as they will stand it, get them potted into their fruiting pots, or planted out on the bench, if so desired. To get early fruit, however, pots are to be preferred, the roots being then more under control.

For the final potting the soil requires to be kept more lumpy; try and retain all the fibre possible, and see that there is ample drainage, so arranged that the water will get away freely. Use a little solid, yet well-rotted, horse or cow manure. A small portion of quarter-inch bone may also be used, but it is better to provide for feeding after the pots are full of roots than to make the soil very rich at first; for this reason, the more growth the less liable is one to get a good set of fruit; and this is important, for on an early set depends whether or not tomatoes can be picked in December and January.

As the plants grow, be careful to trim away all lateral or side shoots. It is better to train to a single stem and keep to that unless the plant is very thrifty and shows an inclination to make a good second stem, which frequently happens.

Another point to watch is the distribution of the plants, that they will get the greatest amount of sunshine. That brings us to the question of training, and of doing this there is a variety of methods. Some adopt only a single stake, others make a

wooden horse or inverted Λ, leaving a path so that two sides can be easily attended to, and in this particular, doubtless, this method is by far the best. Our preference is given to the system adopted by W. Turner, at Rockwood, Tarrytown, N.Y. He makes a wire arch on his centre beds, about seven feet high, which he places inside his two rows of plants. This arch is not acute, but well rounded, so that there is abundant room for the plants to grow and rest upon it. A board is placed on the ground underneath the arch, which is high enough to allow of a man doing the work of tying and pruning.

The houses are span-roof, eighteen feet wide, so that he gets four rows of plants, two being on the centre bed and one each on the side benches, the plants, individually, standing about eighteen inches to two feet apart. Sometimes they are in pots; at others, they are planted out.

The next question — and a vital one — is that of varieties. Of these there are but few, and we name them in order of excellence, according to our experience: Lorillard, Essex Hybrid, Early Michigan, Aristocrat, Early Ruby. Very frequently Dwarf Champion is used, and with many it is popular for side benches, but for this purpose we think Early Michigan is better. The fruit is even-surfaced, of good color, and medium size. Early Ruby will produce lots of fruit, but the corrugations detract from its value. Aristocrat is a heavy tomato, but Lorillard and Essex Hybrid are preëminently the two best.

J. W.

The Committee have made the following awards:

Special Prize from the John A. Lowell Fund.

For the best house of Chrysanthemums arranged for effect with other plants, Mrs. Benjamin P. Cheney,	$50 00
Second, Walter Hunnewell	30 00

Society's Prizes.

For the best house or houses of Chrysanthemums grown on benches, Mrs. Benjamin P. Cheney . . .	50 00
Second, William Nicholson	30 00
For the best bench or frames of Violets, David Nevins,	40 00
Second, James Comley	20 00

For the best Carnation house, William Nicholson . .	$40 00
For the best Fruit Garden, Warren H. Heustis . .	50 00
For the best Vegetable Garden, E. C. Lewis . . .	50 00
Second, Warren H. Heustis	30 00

Gratuities.

Bussey Institution, for a house of Forced Spring Flowering Plants	30 00
James Comley, for a house of Camellias planted in the ground and well grown	30 00
William Nicholson, for a house of Forced Tomatoes .	30 00

Amount appropriated		$500 00
Awarded for prizes	$390 00	
Awarded for gratuities . . .	90 00	
	$480 00	
Balance unexpended . . .	20 00	
		$500 00

Respectfully submitted,

JOHN G. BARKER,
AZELL C. BOWDITCH,
J. WOODWARD MANNING,
E. W. WOOD,
C. N. BRACKETT,
JOSEPH H. WOODFORD,
HENRY W. WILSON,
JACKSON DAWSON,
Committee.

REPORT

OF THE

COMMITTEE OF ARRANGEMENTS

FOR THE YEAR 1896.

Another year has passed away, and we are called upon to chronicle the events pertaining to our part of the success attained by our exhibitions.

The same obstacles obstruct the way that we pointed out in our last report, and until we have more commodious rooms in which to hold our exhibitions, and suitable accommodations for the comfort of visitors, we cannot expect enhanced receipts for admission.

The arrangements of the halls have been good, taking into consideration the limited space at our command, and we have often been congratulated on their splendid appearance, and more particularly at the Chrysanthemum Show. We are indebted to a good friend of the Society, Jerome Jones, Esq., for the loan of three splendid vases to complete the number applied for by exhibitors, and these together with the five belonging to the Society when filled with chrysanthemums were grand features of the exhibition. If the same number of prizes for large vases of chrysanthemums or other long-stemmed flowers are continued in future Schedules, this will make a good chance for some kindly disposed person to distinguish himself or herself by contributing to the Society some vases to fill up the deficiency which now exists.

We constantly bear in mind that, without the hearty coöperation of the gardeners, our exhibitions would be utter failures and without interest to them or the public; therefore our Society is under great obligations to this class of intelligent men, and our

thanks are tendered to them for their enthusiastic interest in the cultivation and exhibition of flowers and the success of our exhibitions.

We would at this time call the earnest attention of the gardeners to the altered rules and prizes in the new Schedule, now being revised by the Committee on Establishing Prizes, for some of the alterations are of the utmost importance to exhibitors, and deserve very careful attention.

We are very happy to say that, notwithstanding the same insufficient accommodations are in use as last year, the arrangements of the halls have been so carefully studied and carried out that no friction has occurred and all unpleasantness has been avoided.

The amount of money which was placed at the disposal of this Committee for extraordinary expenses has been judiciously expended, always having in view the best interests of the Society.

The Treasurer reports the receipts for admission to the

Spring Show	$555 25
Chrysanthemum Show	767 50
Total	$1,322 75

all of which has gone into the treasury of the Society.

The receipts at the Chrysanthemum Show were not so large as last year, although the show was very much superior; probably owing to two days of stormy weather and inadequate accommodations for the comfort of visitors.

All of which is respectfully submitted.

Jos. H. Woodford,
Chairman.

REPORT

OF THE

Committee on School Gardens and Children's Herbariums,

FOR THE YEAR 1896.

By HENRY L. CLAPP, CHAIRMAN.

GEORGE PUTNAM SCHOOL GARDEN, ROXBURY.

Twenty-seven new species and varieties were placed in the garden during the season of 1896, namely:

Antennaria plantaginifolia.
Apios tuberosa.
Aralia nudicaulis.
Aspidium cristatum var. *Clintonianum.*
Aspidium Goldianum.
" *spinulosum* var. *dilatatum.*
Bidens frondosa.
Galium Aparine.
Geranium Carolinianum.
" *Robertianum.*
Habenaria lacera.
" *orbiculata.*
" *virescens.*
Helianthemum Canadense.
Hieracium venosum.
Houstonia cærulea.
Hypoxis erecta.
Lilium Canadense.
Lycopodium lucidulum.
Pedicularis Canadensis.
Phegopteris hexagonoptera.
Prenanthes serpentaria.
Pteris aquilina.
Trientalis Americana.
Trillium erythrocarpum.
" *grandiflorum.*
Viola striata.

The ground was well fertilized in the spring at a cost of five dollars. Two new beds of hardy chrysanthemums were made. In October every teacher's desk in the district was decorated with chrysanthemums in variety. The garden contains eleven varieties of German iris. The *Clematis paniculata*, *Euonymus radicans*, tiger lilies, asters, and golden-rods have made exceptionally

ASTER CORDIFOLIUS. — George Putnam School Garden.

A CORNER OF THE FERNERY. — George Putnam School Garden.

FOURTH GRADE PUPILS OBSERVING. — George Putnam School Garden.

fine growths, owing to the unusual moisture of the season. Six species of native asters have been introduced into the girls' yard spontaneously by seed, and have made vigorous growths. Single plants springing from seed scattered at random blossom much more profusely than clumps of two or more years' standing. Thorough division of clumps is essential to the vigor of the plant and the production of blossoms. A few plants have died out, but most of the plants originally introduced have increased greatly and might aid in establishing other gardens. There are now over one hundred and fifty species of native wild plants in the garden, not to speak of a great variety of hardy cultivated plants.

The garden has been used for observation more this year than in any previous year, composite flowers and ferns receiving the most attention. The pupils of the last graduating class studied minutely fifteen species and varieties of ferns, and twenty-two of these pupils introduced ferns into their own gardens at home. The fernery in the angle of the school building on the north side was visited many times for the comparison and identification of species. Many kinds of seed vessels of flowers, as well as the flowers themselves, have furnished excellent material for drawing, especially with pen and ink.

The influence of this work has been felt in the preparation of herbariums, a majority of the exhibitors at the last Herbarium Exhibition having enjoyed the advantages of this garden. It is hoped that the educative value of the garden may be shown by larger numbers of pupils from year to year.

In comparison with European countries, especially France, Germany, Austria, Sweden, and Russia, school-garden privileges in this country are exceedingly limited. Since 1877 every public school in Berlin, a large *city* in Prussia, has been regularly supplied with plants for study every week, elementary schools receiving specimens of four different species and secondary schools six. During the summer at six o'clock in the morning two large wagons start from the school gardens, loaded with cuttings packed and labelled for the different schools. The daily papers regularly announce what plants may be expected, and teachers consult with the gardeners as to what ought to be sown or planted. Teachers take their classes into the school gardens for lessons in botany, and are aided by the gardeners who cut the specimens.

Still more significant is the recent establishment of many school

gardens in Southern Russia. In one province two hundred and twenty-seven schools out of a total of five hundred and four have school gardens, whose total area is two hundred and eighty-three acres. In 1895 these gardens contained one hundred and eleven thousand fruit trees and two hundred thirty-eight thousand three hundred planted forest trees. In them the schoolmasters teach tree, vine, grain, garden, silkworm, and bee culture. They are supported by small grants of money, from the country and district councils. In the villages small orchards and kitchen gardens are connected with many primary schools. This movement has also widely spread over different provinces of Central Russia. It is worthy of the attention of a Society like this, at least so far as calling the attention of school officials to the rounding out of a city child's education in a very practical manner. The fundamental ideas obtained by a child from direct contact with the things found in the gardens mentioned are not inferior to any ideas obtained from the objects commonly found in a city.

CHILDREN'S HERBARIUMS.

The Children's Herbariums, November 27 and 28, 1896, filled the Lower Hall. Most of the exhibitors of this year had exhibited specimens before, and had learned by observation how to mount plants with the utmost neatness; consequently no careless or hasty work was to be found in the entire exhibit. Those who are able to compare this exhibit with that of 1891 can appreciate the manifest progress that has been made.

The herbarium of Arthur E. French, of Sudbury, was a model of neatness. One can imagine how extensive his explorations must have been, and how much labor was involved in the preparation of his exhibit, by considering the following facts: In 1895 he obtained the first prize for one hundred and twenty-five flowering plants, the first prize for twenty specimens of sedges, and an extra award for excellence in pressing and mounting specimens. This year he exhibited fifty grasses, including thirteen species of Panicum, and one hundred and twenty-five flowering plants, twenty sedges, and ten ferns, all different plants from those which he had previously exhibited.

Arthur C. Faxon, of Jamaica Plain, made an exhibit equally notable, in the form of a fifth contribution to our Annual Herbarium Exhibition. He exhibited one hundred and twenty-five herbaceous plants, grasses, sedges, and ferns. When we consider that these were all different species or varieties of plants from the many which he has shown at four previous exhibitions, we can understand how diligently he has worked and how carefully he has observed. His specimens were complete and accurately named. Among them were the rare asters *A. Faxoni*, *A. Herveyi*, *A. infirmus*, and *A. subulatus*.

Miss Lura J. Durgin, of Boston, received the first prize for one hundred and twenty-five flowering plants, which were finely mounted and showed every essential part. In the case of some specimens the upper part of the plant, including the flowers, was on one sheet and the lower part, including the root, on another.

The Committee, with the aid of all the expert assistance they could call in, were not able to name some specimens in this col-

lection. This shows the need of a permanent herbarium for reference.

Miss Carrie P. Webber, of Bedford, who had exhibited here previously, sent one hundred additional flowering plants and fifteen ferns, the mounting and naming being well done.

Five girls and one boy from Roxbury, Lulie D. Ellis, Mabel M. Wood, Ada C. Wood, Isabelle F. Wiggin, Genevieve A. Goudy, and John P. Goudy, exhibited excellent mounts of ferns.

Gordon Weinz, nine years old, who took a prize for fifty flowering plants in 1895, sent in twenty-five additional flowering plants this year.

There was only one collection of sprays of leaves, which numbered thirty-nine sheets. Like the other herbariums, this one, sent by Katherine A. Dwyer, of Roxbury, showed great care in its preparation.

Mention should be made of Phillips Barry's gift of thirty-six sheets of botanical specimens to the George Putnam School, making in all one hundred and twenty-seven sheets that he has given to the school. These with the eighty-four sheets of leaf-sprays presented by Arthur C. Faxon make a working herbarium of over two hundred specimens.

The attendance was eminently satisfactory, the estimate being about one thousand persons during the two days of the Exhibition. Parents, teachers, and children asked a great many questions, and they will be heard from next year.

The thought seemed to prevail that the exhibition was the work of schools and not of individual pupils. Teachers asked, "Now, to what grade does this pupil belong?" Parents seemed to think their children could take no part in the work unless they came in with a school. It is hoped that parents and teachers will induce individual children to engage in preparing herbariums. It is only in getting together a school herbarium that any large number of children may be expected to continue their efforts.

The prize of fifty ferns offered by Mr. George E. Davenport for the best collection of native ferns sent to the exhibition attracted the attention which it deserved. There were no entries for this prize, owing to a mistaken idea that ferns once exhibited here could not be entered again for this special prize; therefore the parts of fern collections that have been exhibited here annually were left at home. Next year Mr. Davenport will offer two

prizes of ferns, and, now that the matter is understood by those who have exhibited ferns in this hall, we have reason to expect to see some large and fine collections.

It seems proper here to mention that a fine botanical building is to be erected at a cost of $250,000 in the Botanical Garden at Bronx River Park, New York. It is but the start of an institution which it is expected will be superior to any similar one in the country. Particular mention is made of an herbarium and a place for it. Perhaps the Massachusetts Horticultural Society in erecting a new building is not going to be outdone by an Association in New York with $750,000 in hand.

The amount appropriated by the Society for the use of this Committee was . .		$250 00
Awarded for Herbariums	$55 75	
Awarded for School Gardens . . .	15 00	
Suffolk Engraving Company (cuts) . .	10 00	
Printing	37 50	
Advertising	11 40	
Paper	9 81	
Expressage, posters, stamping, etc. . .	6 54	
		146 00
Balance unexpended		$104 00

HENRY L. CLAPP, Roxbury,
MRS. H. L. T. WOLCOTT, Dedham,
GEORGE E. DAVENPORT, Medford,
MISS KATHARINE W. HUSTON, Roxbury,
MRS. P. D. RICHARDS, West Medford,
WILLIAM P. RICH, Chelsea,
W. E. C. RICH, *Secretary*,
99 Moreland st., Roxbury, Mass.

Committee on School Gardens and Children's Herbariums.

PRIZES AND GRATUITIES AWARDED FOR SCHOOL GARDENS AND CHILDREN'S HERBARIUMS.

SCHOOL GARDENS.

George Putnam School, first prize	$15 00

CHILDREN'S HERBARIUMS.

FLOWERING PLANTS. — For one hundred and twenty-five specimens, first prize, Lura J. Durgin	5 00
Second, Arthur C. Faxon	4 00
Gratuities: —	
Arthur E. French, for one hundred and twenty-five additions	7 00
Carrie P. Wilder, for one hundred additions	3 50
Gordon Weinz, for twenty-five additions	1 50
FERNS. — For twenty specimens, first prize, John P. Goudy	3 50
For fifteen specimens, second prize, Carrie P. Webber,	2 00
For ten specimens, first prize, Ada C. Wood	2 00
Second, Isabelle F. Wiggin	1 00
Gratuities: —	
Arthur E. French, for ten additions	3 00
Genevieve A. Goudy, for ten additions	2 00
Mabel M. Wood, for ten additions	2 00
Lulie D. Ellis, for seven additions	1 50
Arthur C. Faxon, for five additions	1 50
GRASSES. — For fifty specimens, first prize, Arthur E. French	5 00
Gratuity: —	
Arthur C. Faxon, for nine additions	2 25

SEDGES.

Gratuities : —

Arthur E. French, for twenty additions . .	$3 00
Arthur C. Faxon, for eleven additions . .	2 00

LEAF SPRAYS. — For thirty-nine sheets, first prize, Katherine A. Dwyer 2 00

Gratuity : —

Arthur C. Faxon, for thirty additions . . .	2 00
Total for Herbariums and Gardens . .	$70 75

REPORT

TO THE

STATE BOARD OF AGRICULTURE

FOR THE YEAR 1896.

By GEORGE CRUICKSHANKS, OF FITCHBURG.

The Massachusetts Horticultural Society began the work of the year with a course of Lectures and Discussions on subjects related to the art and science of horticulture, by the following-named speakers:

January 11. Hardy Garden Plants, by E. O. Orpet, South Lancaster.

January 18. Conservatism in Scientific Agriculture, by Prof. W. H. Jordan, Orono, Me.

January 25. Stove Plants in their Native Tropics, by Prof. George L. Goodale, Cambridge.

February 8. Seed Control: Its Aims, Methods, and Benefits, by Gilbert H. Hicks, Washington, D.C.

February 15. Some Scale Insects, by Prof. L. O. Howard, Washington, D.C.

February 29. Some Tendencies and Problems in the Evolution of Species among Parasitic Fungi, by Prof. George F. Atkinson, Cornell University, Ithaca, N.Y.

March 14. Ornamental Planting for Parks and Public Grounds, by William S. Egerton, Albany, N.Y.

March 21. Grasses, by F. Lamson-Scribner, Washington, D.C.

March 28. Manuring Orchards, by Prof. Edward B. Voorhees, New Brunswick, N.J.

April 11. Mushrooms, Edible and Poisonous, by William C. Bates, Boston.

The lectures and discussions are printed in the Transactions of the Society.

The sum of $8,050 was appropriated for Prizes and Gratuities for 1896.

The Annual Spring Show was held March 24–27. For a number of years much attention has been given to the cultivation of the cyclamen. On a large table at the entrance of the upper hall was the largest and finest show of cyclamens ever seen in Horticultural Hall. The display of spring flowering bulbs, such as fragrant hyacinths, lilies of the valley, narcissuses, jonquils, and tulips was very fine. Notable among pot plants were *Acacia pubescens* and *A. Drummondii*. A fine specimen of the new hardy climbing rose, Crimson Rambler, with nearly two hundred flowers, in fine condition, attracted much attention. The show of cinerarias, roses, carnations, pansies, and violets was very fine. There was a good display of early vegetables, and winter apples and pears.

The Rose and Strawberry Show was held June 23 and 24. The upper hall was devoted to a fine display of roses and large collections of orchids and other flowering plants. In the lower hall about two hundred baskets of strawberries were exhibited. The six baskets of Marshall, four quarts each, on a table near the entrance were the centre of attraction. All the standard varieties and many new seedlings were shown. There was a fine show of hothouse grapes, some bunches weighing nearly seven pounds each. The show of early vegetables was not large, but was very fine.

The Annual Plant and Flower Show opened September 2 for two days. The lower hall was devoted to cut flowers. A raised bank on the platform at the rear of the hall was covered with over twelve hundred dahlias, comprising all sizes and colors and perfect in form. Four long tables were covered with a great variety of cut flowers, including asters, phlox, dianthus, zinnias, and French cannas, with large collections of wild flowers. Pot plants were shown in the upper hall. There were large and fine collections of ferns, palms, crotons, dracænas, fuchsias, and orchids in variety. Several large tanks of aquatic plants were shown. One tank contained twenty-five choice varieties of Nymphæas and Nelumbiums.

The Annual Exhibition of Fruits and Vegetables was held

October 1 and 2. The show of pears was smaller than usual, but apples were abundant. Many fine specimens of apples were shown, but no outdoor peaches and very few plums. Benjamin G. Smith, of Cambridge, one of the oldest members of the Society, celebrated his eightieth birthday, October 1, by exhibiting sixty varieties of hardy native grapes, the largest exhibit ever made by one individual. The show of vegetables was in the lower hall, and included all the standard varieties, which were all well grown and of good quality.

The Annual Chrysanthemum Show opened November 10 and continued four days. The lower hall was filled with cut flowers. Seven large vases were filled with some of the choicest varieties. The tables from the door to the platform were completely filled with a superb display of cut flowers. The upper hall was devoted to the pot plants. In the centre of the hall were fine groups arranged for effect. Palms and other foliage plants were used with the chrysanthemums; the effect was very fine. On one side of the hall were arranged plants in twelve-inch pots that were seven feet broad and five or six feet high, and complete masses of bloom. For large flowers, fine color, and perfect form the Chrysanthemum Show of 1896 has never been equalled.

Respectfully submitted,

GEORGE CRUICKSHANKS,
Delegate.

REPORT

OF THE

COMMITTEE ON THE LIBRARY

FOR THE YEAR 1896.

Cultivators continue to send here for exhibition more illustrations of their skill than can be satisfactorily shown in our limited space; and, in the same way, books and pamphlets continue to find their way to the library regardless of the lack of accommodations they find here; but the increase of exhibits and of books is not a matter to be deprecated — still less to be curtailed. The remedy in each case is the same, and we should no more cease to acquire books and pamphlets than we should cease to send plants, flowers, fruits, and vegetables here to delight and instruct the crowds that throng our halls on all special occasions. The exhibitions, the discussions, and the library are three agencies which have taken and will continue to take an equal share in sustaining and extending the renown of the Massachusetts Horticultural Society.

As usual there is but little to say about this department. The work here continues to fully occupy the Librarian and those who are associated with him. The accessions, which will be enumerated as a supplement to the report of the Librarian, have been of the usual number and importance, and those which have been purchased from the income of the Stickney Fund and from the Society's appropriation have exhausted the entire amount as usual. The Card Catalogue of plates will proceed henceforward on a different plan. Mrs. Andrews has retired from her labors, having written cards for nearly every plate which is not in Pritzel's Index, and it is thought that all the cards made neces-

sary by new acquisitions can be prepared by the force regularly employed. It will be desirable to include in it sometime all which we possess that are in Pritzel's Index, but that time is not yet.

Your Committee, believing that the library is an agency of very great value, regret that the fund to which it owes so much of its growth is soon to pass into other hands, and hope that means may be found which will enable it to continue its increase in size and usefulness.

For the Committee,

W. E. ENDICOTT,
Chairman.

REPORT

OF THE

SECRETARY AND LIBRARIAN

FOR THE YEAR 1896.

As Secretary I have to report in regard to the TRANSACTIONS of the Society that the first part for 1896 has been printed and distributed to members and correspondents of the Society. Of the preceding TRANSACTIONS, the List of Library Accessions, which has previously been published in the second part for each year, was, by direction of the Committee on Publication, omitted in 1895, in order not to delay other matter, and will appear later as Part III. of the TRANSACTIONS for that year. This is the most difficult part of the whole, and requires more labor to present it correctly, but it is now nearly ready for the printer. The Schedule of Prizes for 1896 was, as promised, ready at the beginning of the year, — indeed a few days earlier, — and it is expected that that for 1897 will be equally prompt. The various records of the Society and of Committees, and the correspondence, have been kept up, to the best of the ability of those immediately employed on them.

The List of Library Accessions, though not much longer than last year, shows a steady increase. The work of completing sets has been pursued as heretofore. A special effort has been made to procure such publications of the United States Department of Agriculture as we did not already possess. The full list of these publications, received in March, has afforded much assistance in this work; and the result is that we have now 123 bound volumes and 708 pamphlets of that Department, which was established in 1862, and of the Agricultural Reports of the Patent Office which preceded it. This is more than three-fourths of the whole number, and it is intended to continue the work of col-

lecting as opportunity shall offer. Of course, much the greater part of those acquired are from the Department, but material assistance has been derived from the donations of the families of the late Charles M. Hovey and Hon. Marshall P. Wilder, both Ex-Presidents of the Society, and of the New England Historic-Genealogical Society. Some idea of the magnitude of the work of collecting these publications may be formed from the fact that during the year ending June 30, 1896, 376 publications were issued by the Department of Agriculture. The work would be much less but for the great irregularity in the receipt of these publications, necessitating frequent applications for publications to fill gaps; and too often we are informed, though the application is made as soon as the hiatus is discovered, that the edition is exhausted. A most fortunate acquisition is the Conclusion of "Old and Remarkable Trees of Scotland," published by the Highland and Agricultural Society of Scotland, a fragment of which has been on our shelves for thirty years. This interesting little work is now perfected.

Ten volumes of the Silva of North America, by our fellow-member, Charles S. Sargent, have been published, volumes nine and ten having been received during the year now closing. It is seldom that a work of the importance and magnitude of this appears so rapidly and promptly. The Phycotheca Boreali-Americana, a collection of dried specimens of the Algæ of North America, whose leading author, Frank Shipley Collins, is also a member of this Society, has reached its fifth fascicle. The Evolution of Horticulture in New England, by Daniel Denison Slade, another of our members, though smaller, is more generally interesting, and derives additional value from the lamented death of its author soon after its publication. The authors of these three works have all sought and found in this library assistance in their composition.

During the year Parts VIII. and IX. of the Marquess of Lothian's Monograph of the Genus Masdevallia, completing that magnificent work, have been received. The publication of Fitzgerald's Australian Orchids, the first part of which was received by us in 1880, which was interrupted by the death of the author, has been resumed, and it is hoped will be soon completed. The Florilegium Harlemense, with colored plates of the flowers of bulbous rooted plants, has been subscribed for and the first num-

ber has been received, and a copy of its predecessor, the Album Van Eeden, has also been obtained.

It has ever been the purpose of those charged with the selection of books for purchase to acquire all American works suited to this library, and in pursuance of this purpose we secured at an auction sale a copy of the American Flora or History of Plants and Wild Flowers, with colored plates, by A. B. Strong, M.D., published in New York, 1848 to 1851. The first volume of the Illustrated Flora of the Northern United States, Canada and the British Possessions, by Nathaniel Lord Britton, Ph.D., and Hon. Addison Brown, published at New York during the present year, has also been received. In another class of books, L'Horticulteur Français, in twenty-one volumes, with many colored plates, published at Paris from 1851 to 1873, is a valuable acquisition.

The culture of Nuts of various kinds is beginning to attract much attention. Previously to this year we possessed only one or two German books on this subject, but this year we have added one from the Division of Pomology in the United States Department of Agriculture, on Nut Culture in the United States, with colored and plain plates, and the widow of our lamented Corresponding Member, Andrew S. Fuller, has presented a copy of his book, The Nut Culturist, published since his death.

We are indebted to one of our members, Dr. William P. Bolles, for several valuable German works on Medical and Physiological Botany. A Manuscript Journal of horticultural operations, kept in Dorchester from 1822 to 1836, presented by Mrs. J. F. Pratt, is a unique book. It would be interesting to know who was the writer, but the book affords no clew to his name.

The extraordinary interest which has grown up in the last two years in Edible Mushrooms has led to a much more general use of our books on that subject, by members and others, and it is a source of gratification that these inquirers have found the Library so well equipped to meet them. It is to be hoped — and we trust it will be so — that when a similar interest shall be awakened in any other subject connected with the work of the Society, the Library may be found equally well prepared, and that books which may now appear comparatively useless may then be found of the highest value.

In estimating the value of this library it should never be for-

gotten that its chief use is as a reference and not as a circulating library. As there seems to be continual danger of misconception on this point, I take the liberty to repeat what was said on it in a report some years ago: "Statistics of circulation are out of the argument as regards a library whose maintenance ensures the preservation of the best fruits of advanced research, in a repository accessible to scholars and students. As has been well said by competent judges, treating of a 'library for advanced students, or for persons making researches of a learned nature,' — 'the benefit reaped from it by the community cannot be reckoned by any method of statistics. It is by means of such collections as this that some of the greatest benefactors of the public are enabled to prosecute their researches and do their work.'"

The book of Library Wants, for the reception of the names of such books as may be desired by members, which has been kept at the Librarian's desk for nearly twenty years, is still open for the expression of such desires. I regret that it has not received more entries, and hope that hereafter it may be more freely used.

A count of the books, etc., in the Library was made during the summer, which resulted as follows: Books, 9,875; Pamphlets, 6,781; Nursery and Seed Catalogues, 7,273.

I wish here to express my grateful sense of the appreciation by the Library Committee of the difficulties surrounding the work on the Library, and the heartiness with which the Librarian and his assistants have been supported in the discharge of their duties.

ROBERT MANNING,
Librarian.

TREASURER'S REPORT

FOR THE YEAR 1896.

MASSACHUSETTS HORTICULTURAL SOCIETY *in account current to December 31, 1896, with* CHARLES E. RICHARDSON, *Treasurer.*

1896.	DR.		
Dec. 31.	To amount paid on account of the Library in 1896:		
	For books, periodicals, and binding .	$400 00	
	From income of Josiah Stickney Fund for books	684 57	
			$1,084 57
	To amount paid Interest on Funds for Prizes, etc., credited below		1,892 72
	To Prizes awarded in 1895 paid in 1896 as follows:		
	For Plants	$1,981 06	
	" Flowers	2,517 68	
	" Fruits	1,531 53	
	" Vegetables	1,167 00	
	" Gardens and Greenhouses . .	485 00	
	" H. H. Hunnewell Prizes for Rhododendrons	105 00	
	" Special Prize for Palms at Carnation Show	100 00	
			7,887 27
	To amount paid Committee on School Gardens and Children's Herbariums		146 00
	" " Salaries of Secretary, Assistant, and Treasurer . .	$3,600 00	
	" " Salaries of Committees . .	1,008 00	
	" " extra services in Library and on Transactions . . .	657 25	
	" " Committee of Arrangements .	399 90	
	Amounts carried forward	$5,665 15	$11,010 56

Amounts brought forward	$5,665 15	$11,010 56
To amount paid for Insurance . . .	90 20	
" " Repairs	500 50	
" " Furniture and Exhibition Ware	4 50	
" " Heating	526 54	
" " Lighting	849 44	
" " Water Rates . . .	247 40	
" " Publication and Discussion	291 80	
" " Taxes, 1896 . . .	2,580 00	
" " Commission . . .	30 00	
" " Incidentals . . .	702 91	
" " Stationery, Printing, and Postage . . .	2,232 59	
" " Labor	2,739 10	
" paid to Mrs. P. Manning . .	5,500 00	
" " H. H. Hunnewell . .	4,000 00	
" advanced A. P. Loring . . .	2,500 00	
" paid for Legal Services . . .	550 00	
		29,010 13
Total payment		$40,020 69
Balance of Cash, December 31, 1896		6,600 61
		$46,621 30

1896.	Cr.			
Jan. 1.	By Balance of account rendered December 31, 1895			$7,495 35
	By amount received from Building in 1896, viz.:			
	Rent of Stores	$16,834 14		
	" Halls	3,058 34		
			$19,892 48	
	By Income from Mount Auburn		3,682 87	
	" Massachusetts State Bounty		600 00	
	" Annual Exhibitions:			
	Gross receipts	$1,322 75		
	Less expenses	759 66		
			563 09	
	" Admissions and Assessments		1,288 00	
	" Notes Receivable		304 85	
	" Sales of Transactions		7 00	
	" Interest on Bonds	$1,272 50		
	" " Bank Balance	29 59		
	" " other sources	60 00		
			1,362 09	
	" Josiah Stickney Fund for duplicate book		85	
	" H. H. Hunnewell, prize money for 1895		32 00	
	" H. H. Hunnewell		5,000 00	
	" Casualty Insurance Company of St. Louis		4,000 00	
	" Chicago, Burlington, and Quincy R.R. Bond, matured		500 00	
	" Interest credited following Funds charged above:			
	Samuel Appleton Fund	$50 00		
	John A. Lowell Fund	50 00		
	Theodore Lyman Fund	550 00		
	Josiah Bradley Fund	50 00		
	Benjamin V. French Fund	25 00		
	H. H. Hunnewell Fund	200 00		
	William J. Walker Fund	117 72		
	Levi Whitcomb Fund	25 00		
	Benjamin B. Davis Fund	25 00		
	Marshall P. Wilder Fund	50 00		
Amounts carried forward		$1,142 72	$37,233 23	$7,495 35

Amounts brought forward . . .	$1,142 72	$37,233 23	$7,495 35
J. Lewis Russell Fund .	50 00		
Josiah Stickney Fund, as agreed	700 00		
		1,892 72	
			39,125 95
			$46,621 30

CHARLES E. RICHARDSON,
Treasurer.

H. H. Hunnewell,
Francis H. Appleton,
Augustus Hemenway,
} *Finance Committee.*

ASSETS AND LIABILITIES OF THE MASSACHUSETTS HORTICULTURAL SOCIETY,

DECEMBER 31, 1896.

ASSETS.

Real Estate	$250,000 00	
Stereotype Plates and copies of History	257 00	
Chicago, Burlington & Quincy R.R. Bonds	1,000 00	
Sinking Fund	23,872 50	
Kansas City, Clinton & Springfield R.R. Bonds	1,980 00	
Library	35,897 19	
Furniture and Exhibition Ware	6,993 41	
A. P. Loring, Executor	7,500 00	
Due from Tenants	1,535 46	
Cash	6,600 61	
		$335,686 17

LIABILITIES.

Mortgage		$1,000 00	
H. H. Hunnewell		1,000 00	
Josiah Stickney Fund, payable to Harvard College, 1899		12,000 00	
Prize Funds invested in Building:			
Samuel Appleton Fund,	$1,000 00		
Theodore Lyman "	11,000 00		
John A. Lowell "	1,000 00		
Josiah Bradley "	1,000 00		
Benjamin V. French "	500 00		
H. H. Hunnewell "	3,000 00		
William J. Walker "	2,354 43		
Levi Whitcomb "	500 00		
Benjamin B. Davis "	500 00		
	$20,854 43		
Prize Funds invested in Bonds:			
H. H. Hunnewell Fund	$1,000 00		
Marshall P. Wilder "	1,000 00		
J. Lewis Russell "	1,000 00		
	3,000 00		
		23,854 43	
Prizes for 1896, payable in 1897		8,050 00	
			45,904 43
Surplus			$289,731 74

CHAS. E. RICHARDSON, *Treasurer.*

Membership Account of Massachusetts Horticultural Society, December 31, 1896.

Life Members per last report	563		
Added during 1896	23		
Commuted from Annual	1		
		587	
Deceased		33	
			554
Annual Members per last report	222		
Added during 1896	20		
Reinstated	1		
		243	
Commuted to Life	1		
Deceased	13		
Resigned	6		
Dropped for non-payment for two years	11		
		31	
			212
Present Membership			766

INCOME FROM MEMBERSHIP.

23 new Life Members @ $30	$690 00
20 new Annual Members @ $10	200 00
1 commuted to Life	20 00
Annual Assessments	378 00
	$1,288 00

CHARLES E. RICHARDSON, *Treasurer.*

Dr. *Massachusetts Horticultural Society in account with the Proprietors of the Cemetery of Mt. Auburn.* Cr.

For Sales and Improvements within the Cemetery for the year ending December 31, 1896.

To cost of filling up and improving land at Mount Auburn for the year ending December 31, 1896, the Massachusetts Horticultural Society being charged with their proportion of the same:			By sales in January		$290 00
Birch to Eagle and Cherry Avenues	$230 62		" " February		
Magnolia Avenue and Vinca Path	277 50		" " March		85 00
	$508 12		" " April		1,305 00
			" " May		2,614 60
One-quarter of $508.12 is	$127 03		" " June		3,539 00
Balance due Mass. Horticultural Society	3,682 87		" " July		490 00
		$3,809 90	" " August		3,060 00
			" " September		952 00
			" " October		1,540 00
			" " November		980 00
			" " December		890 00
					$15,745 60
			Net amount received from Receiving Tomb		894 00
					$16,639 60
			Deduct for annual expenses		1,400 00
					$15,239 60
		$3,809 90	Mass. Horticultural Society ¼ part of $15,239.60		$3,809 90

E. & O. E.

H. B. MACKINTOSH, *Treasurer.*

December 31, 1896.

MASSACHUSETTS HORTICULTURAL SOCIETY

To the PROPRIETORS OF THE CEMETERY OF MOUNT AUBURN, *Dr.*

For one-fourth part of the following expenditures, for the grading new lands for sale during the year 1896:

Birch to Eagle and Cherry Avenues.

102½ days, men	$230 62	
		$230 62

Magnolia Avenue and Vinca Path.

74 days, man and horse	$277 50	
		277 50
		$508 12
One-fourth of $508.12 is		$127 03

JAMES C. SCORGIE,
Superintendent of the Cemetery of Mount Auburn.

MOUNT AUBURN, December 31, 1896.

I certify the foregoing to be a true copy of improvements for the year 1896, rendered by the Superintendent.

H. B. MACKINTOSH, *Treasurer.*

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1897.

President.

FRANCIS H. APPLETON, of Peabody.

Vice-Presidents.

CHARLES H. B. BRECK, of Brighton. WALTER HUNNEWELL, of Wellesley.
AUGUSTUS PARKER, of Roxbury. BENJAMIN P. WARE, of Clifton.

Treasurer and Superintendent of the Building.

CHARLES E. RICHARDSON, of Cambridge.

Secretary and Librarian.

ROBERT MANNING, of Salem.[1]

Professor of Botany and Vegetable Physiology.

BENJAMIN M. WATSON, of Jamaica Plain.

Professor of Entomology.

SAMUEL H. SCUDDER, of Cambridge.

Delegate to the State Board of Agriculture.

E. W. WOOD, of West Newton.

[1] Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

STANDING COMMITTEES.

Executive.

THE PRESIDENT, FRANCIS H. APPLETON, CHAIRMAN.

THE CHAIRMAN OF THE FINANCE COMMITTEE, H. H. HUNNEWELL, *Ex officio.*

WILLIAM C. STRONG.
WILLIAM H. SPOONER.
NATHANIEL T. KIDDER.
BENJAMIN C. CLARK.
WALTER HUNNEWELL
CHARLES W. PARKER.
CHARLES F. CURTIS.

Finance.

H. HOLLIS HUNNEWELL, OF BOSTON, CHAIRMAN.

FRANCIS H. APPLETON.
AUGUSTUS HEMENWAY.

Lectures and Publication.

J. D. W. FRENCH, OF BOSTON, CHAIRMAN.

BENJAMIN M. WATSON.
NATHANIEL T. KIDDER.

Library.

WILLIAM E. ENDICOTT, OF CANTON, CHAIRMAN.

GEORGE W. HUMPHREY.
EDWIN FAXON.
WALTER S. PARKER.
GEORGE E. DAVENPORT.

Plants.

AZELL C. BOWDITCH, OF SOMERVILLE, CHAIRMAN.

JAMES COMLEY.
JAMES WHEELER.
WILLIAM J. MARTIN.
ARTHUR H. FEWKES.

Flowers.

J. WOODWARD MANNING, OF READING, CHAIRMAN.

MICHAEL H. NORTON.
KENNETH FINLAYSON.
FREDERICK S. DAVIS.
GEORGE E. DAVENPORT.

Fruits.

E. W. WOOD, OF WEST NEWTON, CHAIRMAN.

CHARLES F. CURTIS.
O. B. HADWEN.
WARREN FENNO.
SAMUEL HARTWELL.
J. WILLARD HILL.
SUMNER COOLIDGE.

Vegetables.

CHARLES N. BRACKETT, OF WATERTOWN, CHAIRMAN.

CEPHAS H. BRACKETT.
P. G. HANSON.
VARNUM FROST.
WARREN H. HEUSTIS.
WALTER RUSSELL.
AARON LOW.

Gardens.

JOHN G. BARKER, of Boston, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND ARRANGEMENTS, *Ex officiis*.

HENRY W. WILSON. JACKSON DAWSON.

For Establishing Prizes.

WILLIAM J. STEWART, of Winchester, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis*.

MRS. P. D. RICHARDS.

Committee of Arrangements.

JOSEPH H. WOODFORD, of Boston, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis*.

ROBERT FARQUHAR.

MEMBERS FOR LIFE.

Members of the Society and all other persons who may know of deaths, changes in residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to members whose names are marked thus †.

Adams, Luther, Brighton.
Albro, Charles, Taunton.
Alger, Rev. R. F., Becket.
Allen, Hon. Charles H., Lowell.
Ames, Frank M., Canton.
Ames, George, Boston.
Ames, Oakes, 2d, North Easton.
Ames, Preston Adams, Boston.
Amory, Charles, Boston.
Amory, Frederick, Boston.
Andrews, Charles L., Milton.
Andrews, Frank W., Washington, D. C.
Andros, Milton, San Francisco, Cal.
Appleton, Edward, Reading.
Appleton, Francis H., Peabody.
Appleton, William S., Boston.
Ash, John, Pomfret, Conn.
Atkins, Edwin F., Belmont.
Ayling, Isaac, M. D., Brookline.

Bailey, Jason S., West Roxbury.
Bancroft, John C., Boston.
Banfield, Francis L., M. D., Worcester.
Barber, J. Wesley, Newton.
Barnard, James M., Malden.
Barnard, Robert M., Everett.
Barnes, Walter S., Somerville.
Barnes, William H., Boston.
†Barney, Levi C., Boston.
Barratt, James, East Pasadena, Cal.
Barrett, Edwin S., Concord.
Barry, William C., Rochester, N. Y.
Bartlett, Edmund, Newburyport.
Beal, Leander, Boston.
Becker, Frederick C., North Cambridge.
Beckford, Daniel R., Jr., Jamaica Plain.
Beebe, E. Pierson, Boston.
Beebe, Franklin H., Boston.
Beebe, J. Arthur, Boston.
Berry, James, Brookline.
Birchard, Charles, Framingham.
Blake, Francis, Weston.
Blake, Frederick A., Rochdale.
Blakemore, John E., Roslindale.
Blanchard, John W., Dorchester.
Blinn, Richard D., Chicago, Ill.
Bliss, William, Boston.
Boardman, Samuel M., Milton.
Böcher, Prof. Ferdinand, Cambridge.
Bockus, Charles E., Dorchester.
Bosler, Frank C., Carlisle, Penn.
†Botume, John, Wyoming.
Bowditch, Azell C., Somerville.
Bowditch, Charles P., Jamaica Plain.
Bowditch, James H., Brookline.
Bowditch, Nathaniel I., Framingham.
Bowditch, William E., Roxbury.
Bowker, William H., Boston.

Brackett, Cephas H., Brighton.
Brackett, Charles N., Watertown.
Bresee, Albert, Hubbardton, Vt.
Brewer, Francis W., Hingham.
Brigham, William T., Honolulu, Hawaii.
Brooks, J. Henry, Milton.
Brown, Alfred S., Jamaica Plain.
Brown, Charles E., Yarmouth, N. S.
Brown, Edward J., Weston.
Brown, George Barnard, Brookline.
Brown, George Bruce, Framingham.
Brown, John T., Newburyport.
Bullard, John R., Dedham.
Bullard, William S., Boston.
Burnett, Harry, Southborough.
Burr, Fearing, Hingham.
Burr, Matthew H., Hingham.
Buswell, Edwin W., Brooklyn, N. Y.
Buswell, Frank E., Brooklyn, N. Y.
Butler, Aaron, Wakefield.
Butler, Edward K., Jamaica Plain.

Cabot, Edward C., Brookline.
†Cadness, John, Flushing, N. Y.
Cains, William, South Boston.
Calder, Augustus P., Boston.
Cameron, Robert, Cambridge.
Campbell, Francis, Cambridge.
Capen, John, Boston.
Carlton, Samuel A., Boston.
Carr, Hon. John, Roxbury.
Carter, Charles N., Boston.
Carter, Miss Maria E., Woburn.
Cartwright, George, Dedham.
Chadbourne, Marshall W., Mount Auburn.
Chaffin, John C., Newton.
Chamberlain, Chauncey W., Boston.
Chase, Andrew J., Lynn.
Chase, Daniel E., Somerville.
Chase, George B., Boston.
Chase, William M., Everett.
Chency, Mrs. Elizabeth S., Wellesley.
Childs, Nathaniel R., Boston.
Choate, Charles F., Southborough.
Christie, William, Newton.
Claflin, Hon. William, Newtonville.
Clapp, Edward B., Dorchester.
Clapp, James H., Dorchester.
Clapp, William C., Dorchester.
Clark, Benjamin C., Boston.
Clark, B. Preston, Cohasset.
Clark, Miss Eleanor J., Pomfret Centre, Conn.
Clark, J. Warren, Rockville.
Clarke, Miss Cora H., Jamaica Plain.
Cleary, Lawrence, West Roxbury.
Clough, Micajah Pratt, Lynn.
Cobb, Albert A., Brookline.
Cobb, John C., Milton.
Coburn, Isaac E., Everett.
Codman, James M., Brookline.
Codman, Ogden, Lincoln.
Collamore, Miss Helen, Boston.
Converse, Elisha S., Malden.
Converse, Parker L., Woburn.
Coolidge, Joshua, Mount Auburn.
Cottle, Henry C., Boston.
Cowing, Walter H., West Roxbury.
Cox, Thomas A., Dorchester.
Coy, Samuel I., Boston.
Crawford, Dr. Sarah M., Roxbury.
Crocker, Miss S. H., Boston.
Crosby, George E., West Medford.
†Crowell, Randall H., Chelsea.
Cummings, Hon. John, Woburn.
Curtis, Charles F., Jamaica Plain.
Curtis, George S., Jamaica Plain.
Cushing, Livingston, Weston.
Cushing, Robert M., Boston.

†Daggett, Henry C., Boston.
Dana, Charles B., Wellesley.
Davenport, Albert M., Watertown.
Davenport, Edward, Dorchester.
Davenport, George E., Medford.
Davenport, Henry, New York.
Davis, John, Lowell.
Dawson, Jackson, Jamaica Plain.
Day, William F., Egypt.
Dee, Thomas W., Mount Auburn.
Denny, Clarence H., Boston.

Denton, Eben, Dorchester.
Dewson, Francis A., Newtonville.
Dexter, F. Gordon, Boston.
Dickerman, George H., Somerville.
Dike, Charles C., Stoneham.
Doliber, Thomas, Brookline.
Donald, William, West Roxbury.
Dorr, George, Dorchester.
Dove, George W. W., Andover.
Dowse, William B. H., West Newton.
Draper, Hon. Eben S., Hopedale.
Dreer, William F., Philadelphia, Pa.
Dunlap, James H., Nashua, N. H.
Durant, William, Boston.
Durfee, George B., Fall River.
Dutcher, Frank J., Hopedale.

Eaton, Horace, Cambridge.
Edgar, William W., Waverly.
Eldredge, H. Fisher, Boston.
†Eldridge, E. H., Roxbury.
Eliot, Charles, Brookline.
Ellicott, Joseph P., Boston.
Elliot, Mrs. John W., Boston.
Elliott, William H., Brighton.
Endicott, William E., Canton.
Endicott, William, Jr., Boston.
Everett, William, Dorchester.
Ewell, Warren, Dorchester.

Fairchild, Charles, Boston.
Falconer, William, Pittsburgh, Pa.
Farlow, Lewis H., Newton.
Farnsworth, Mrs. William, Dedham.
Farquhar, James F. M., Roslindale.
Farquhar, John K. M. L., Roxbury.
Farquhar, Robert, Boston.
Faxon, John, Quincy.
Fewkes, Arthur H., Newton Highlands.
Finlayson, Kenneth, Brookline.
Fisher, David, Montvale.
Fisher, James, Roxbury.
†Fisher, Warren, Roxbury.
Flagg, Augustus, Boston.
Fletcher, George V., Belmont.
Fletcher, John W., Chelsea.
Fletcher, J. Henry, Belmont.
Flint, David B., Boston.
Foster, Francis C., Cambridge.
Fottler, John, Jr., Dorchester.
Fowle, George W., Jamaica Plain.
Fowle, William B., Auburndale.
French, Jonathan, Boston.
French, J. D. Williams, Boston.
French, S. Waldo, Jamaica Plain.
French, W. Clifford, Newton.
Frohock, Roscoe R., Malden.

Galloupe, Charles W., Swampscott.
Galvin, John, Boston.
Gardner, George A., Boston.
Gardner, George P., Boston.
†Gardner, Henry N., Mount Auburn.
Gardner, John L., Brookline.
Gibbs, Wolcott, M.D., Newport, R. I.
Gill, George B., Medford.
Gillard, William, Harrison Square, Dorchester.
Gilmore, E. W., North Easton.
Gilson, F. Howard, Reading.
Glover, Joseph B., Boston.
Goddard, A. Warren, Brookline.
Goddard, Joseph, Sharon.
Goddard, Mrs. Mary T., Newton.
Goodell, L. W., Dwight.
Gorham, James L., Jamaica Plain.
†Gould, Samuel, Boston.
Gowing, Mrs. Clara E., Kendall Green.
Gray, James, Wellesley.
Gregory, Hon. James J. H., Marblehead.
Greig, George, Toronto, Ontario.
Grey, Benjamin, Malden.
Guild, J. Anson, Brookline.

Hadwen, Obadiah B., Worcester.
Hall, Edwin A., Cambridgeport.
Hall, George A., Chelsea.
Hall, George R., M.D., Warren, R. I.
Hall, Lewis, Cambridge.
Hall, William F., Brookline.
Halliday, William H., South Boston.

Hammond, Gardiner G., New London, Conn.
Hammond, George W., Boston.
Hammond, Samuel, Boston.
Hanson, P. G., Woburn.
†Harding, George W., Arlington.
Harding, Louis B., Stamford, Conn.
Hardy, F. D., Cambridgeport.
Harris, Charles, Cambridge.
Harris, Thaddeus William, A. M., Keene, N. H.
Harwood, George Fred, Newton.
Haskell, John C., Lynn.
Hastings, Levi W., Brookline.
Hatch, Mrs. C. S., North Cambridge.
Hatch, Edward, Boston.
Hathaway, Seth W., Marblehead.
Hawken, Mrs. Thomas, Rockland, Me.
†Hazeltine, Hazen, Boston.
Hemenway, Augustus, Canton.
Henshaw, Joseph P. B., Boston.
Hews, Albert H., North Cambridge.
Heywood, Hon. George, Concord.
Hilbourn, A. J., Boston.
Hill, John, Stoneham.
Hittinger, Jacob, Mount Auburn.
Hoar, Samuel, Concord.
Hodgkins, John E., Portsmouth, N. H.
Hoitt, Hon. Charles W., Nashua, N. H.
Hollingsworth, Amor L., Milton.
Hollis, George W., Grantville.
Hollis, John W., Allston.
Holmes, Edward J., Boston.
Holt, Mrs. Stephen A., Winchester.
Horner, Mrs. Charlotte N. S., Georgetown.
Horsford, Miss Kate, Cambridge.
Hovey, Charles H., Pasadena, Cal.
Hovey, Stillman S., Woburn.
Hubbard, Charles T., Weston.
Hubbard, Charles Wells, Weston.
Hubbard, Gardiner G., Washington, D. C.
Hubbard, James C., Everett.
Humphrey, George W., Dedham.
Hunnewell, Arthur, Wellesley.
Hunnewell, Henry Sargent, Wellesley.
Hunnewell, H. Hollis, Wellesley.
Hunnewell, Walter, Wellesley.
Hunt, Dudley F., Reading.
Hunt, Francis W., Melrose.
†Hunt, Franklin, Boston.
Hunt, William H., Concord.
Hyde, James F. C., Newton Highlands.

Jack, John George, Jamaica Plain.
Jackson, Charles L., Cambridge.
Jackson, Robert T., Dorchester.
Janvrin, William S., Revere.
Jeffries, John, Boston.
Jenks, Charles W., Bedford.
Johnson, J. Frank, Boston.
Jones, Jerome, Brookline.
Jose, Edwin H., Cambridgeport.
Joyce, Mrs. E. S., Medford.

Kakas, Edward, West Medford.
Kelly, George B., Jamaica Plain.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
†Kendall, Joseph R., San Francisco, Cal.
Kendall, Dr. Walter G., Atlantic.
Kendrick, Mrs. H. P., Allston.
Kennedy, George G., M.D., Roxbury.
Kent, John, Brookline.
†Keyes, E. W., Denver, Col.
Keyes, John M., Concord.
Kidder, Charles A., Southborough.
Kidder, Nathaniel T., Milton.
†Kimball, A. P., Boston.
King, Franklin, Dorchester.
Kingman, Abner A., Brookline.
Kingman, C. D., Middleborough.
Kinney, John M., Boston.
Knapp, Walter H., Newtonville.

Lancaster, Charles B., Newton.
Lawrence, Amory A., Boston.

Lawrence, Amos A., Boston.
Lawrence, James, Groton.
Lawrence, John, Groton.
Learned, Charles A., Arlington.
Lee, Charles J., Dorchester.
Lee, Daniel D., Jamaica Plain.
Lee, Francis H., Salem.
Lee, Henry, Boston.
Leeson, Hon. Joseph R., Newton Centre.
Lemme, Frederick, Charlestown.
Leuchars, Robert B., Boston.
Lewis, William G., Framingham.
Lincoln, George, Hingham.
Lincoln, Col. Solomon, Boston.
Little, James L., Brookline.
Lockwood, Rhodes, Boston.
Lodge, Richard W., Swampscott.
Loftus, John P., Dorchester.
Loring, Caleb W., Beverly Farms.
Lothrop, William S. H., Boston.
Lovett, George L., West Newton.
†Lowder, John, Watertown.
Lowell, Augustus, Boston.
Luke, Elijah H., Cambridgeport.
Lumb, William, Boston.
Lunt, William W., Hingham.
Lyman, George H., Wareham.
Lyman, Col. Theodore, Brookline.
Lyon, Henry, M. D., Charlestown.

†Mahoney, John, Boston.
Mallet, E. B., Jr., Freeport, Maine.
Mann, James F., Ipswich.
Manning, Jacob W., Reading.
Manning, Mrs. Lydia B., Reading.
Manning, Robert, Salem.
Manning, Warren H., Brookline.
Marshall, Frederick F., Chelsea.
Mason, Col. Frederick, Taunton
Matthews, Nathan, Boston.
McCarty, Timothy, Providence, R.I.
McClure, John, Revere
McWilliam, George, Whitinsville.
Melvin, James C., West Newton.
Merriam, Herbert, Weston.
Merriam, M. H., Lexington.
Merrifield, William T., Worcester.
Merrill, Hon. Moody, Roxbury.
Metivier, James, Cambridge.
Milmore, Mrs. Joseph, Washington, D. C.
Minton, James, Boston.
Mitton, Edward J., Brookline.
Mixter, George, Boston.
Monteith, David, Dedham.
Montgomery, Alexander, Natick.
Moore, John H., Concord.
†Morse, Samuel F., Boston.
Moseley, Charles H., Dorchester.
Mudge, George A., Portsmouth, N. H.
Murphy, William Bowen, Boston.

Nevins, David, Framingham.
Newman, John R., Winchester.
Newton, Rev. William W., Pittsfield.
Nickerson, George A., Dedham.
Norton, Charles W., Allston.
Norton, Edward E., Boston.

Oakman, Hiram A., North Marshfield.
Olmsted, John Charles, Brookline.

Packer, Charles H., Boston.
Paige, Clifton H , Mattapan.
Paige, John C., Boston.
Palmer, Julius A., Jr., Boston.
Parker, Augustus, Roxbury.
Parker, Charles W., Boston.
Partridge, Horace, North Cambridge.
Paul, Alfred W., Dighton.
Peabody, Francis H., Boston.
Peabody, John E., Boston.
Peck, O. H., Denver, Col.
Peck, William G., Arlington.
Peirce, Silas, Boston.
Perkins, Edward N., Jamaica Plain.
†Perry, George W., Malden.
Philbrick, William D., Newton Centre.
Pierce, Dean, Brookline.
Pierce, George Francis, Dorchester.

Poor, John R., Boston.
Porter, James C., Wollaston.
Potter, Joseph S., Fredericksburg, Va.
Prang, Louis, Roxbury.
Pratt, Laban, Dorchester.
Pratt, Lucius G., West Newton.
Pratt, Robert M., Boston.
Pratt, William, Winchester.
Pray, Dr. Mark W., Boston.
†Prescott, Eben C., New York.
Prescott, William G., Quincy.
Pringle, Cyrus G., Charlotte, Vt.
Prouty, Gardner, Littleton.
Putnam, Joshua H , Newton Centre.

Quinby, Hosea M., M.D., Worcester.

Raddin, Everett W., North Cambridge.
Rand, Miss Elizabeth L., Newton Highlands.
Rand, Harry S., North Cambridge.
Rand, Oliver J., Cambridgeport.
Rawson, Warren W., Arlington.
Ray, James F., Franklin.
Ray, Hon. James P., Franklin.
Ray, Hon. Joseph G., Franklin.
Raymond, Walter, Boston.
Read, Charles A., Manchester.
Reardon, John B., Boston.
Reed, George W., Boston.
Rice, George C., Worcester.
Richards, John J., Boston.
Richardson, Charles E., Cambridge.
Rinn, J. Ph., Boston.
Ripley, Charles, Dorchester.
Ripley, Ebed L., Hingham Centre.
Robbins, I. Gilbert, Melrose Highlands.
Robinson, John, Salem.
Robinson, Joseph B., Allston.
Robinson, Warren J., Somerville.
Ross, Henry, Newtonville.
Ross, Waldo O., Boston.
Ruddick, William H., M. D., South Boston.
Russell, George, Woburn.
Russell, Hon. John E., Leicester.
Russell, Walter, Arlington.

Salisbury, William C. G., Boston.
Sanford, Oliver S., Hyde Park.
Sargent, Charles S., Brookline.
Saville, Richard L., Brookline.
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
Scorgie, James C., Cambridge.
†Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, J. Montgomery, Boston.
Shaw, Christopher C., Milford, N. H.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Siebrecht, H. A., New Rochelle, N. Y.
Simpkins, Hon. John, Yarmouthport.
Skinner, Francis, Boston.
Smith, Benjamin G., Cambridge.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Jamaica Plain.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco, Cal.
Smith, George O., Boston.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Snow, Miss Salome H., Brunswick, Me.
Spaulding, Edward, West Newton.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Sprague, Hon. Charles F., Brookline.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M. D., Roslindale.
Stewart, William J., Winchester.
Stone, Charles W., Boston.
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Sturgis, Russell, Manchester.
Sturtevant, E. Lewis, M. D., South Framingham.

Surette, Louis A., Concord.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Taft, John B., Cambridge.
Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G., M. D., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thompson, Leonard, Woburn.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Trepess, Samuel J., Spokane, Wash.
†Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Underwood, William J., Belmont.

Vander-Woerd, Charles, Waltham.
Vinal, Miss Mary L., Somerville.

Wainwright, William L., Braintree.
Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Edward C. R., Roxbury.
Walker, Miss Mary S., Waltham.
Walley, Mrs. W. P., Boston.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Washburn, Andrew, Hyde Park.
Watson, Benjamin M., Jamaica Plain.
Watson, Thomas A., East Braintree.
Watts, Isaac, Waverly.
Webber, Aaron D., Boston.
Weld, Christopher Minot, Jamaica Plain.
Weld, George W., Newport, R. I.
Weld, Otis E., Boston.
Weld, Richard H., Boston.
West, Mrs. Maria L., Neponset.
Weston, Leonard W., Lincoln.
Weston, Seth, Revere.
Wheeler, Frank, Concord.
Wheelwright, A. C., Brookline.
Whitcomb, William B., Medford.
White, Francis A., Brookline.
White, Joseph H., Brookline.
Whitney, Arthur E., Winchester.
Whitney, Ellerton P., Milton.
Whitten, Charles V., Dorchester.
Whittier, Hon. Charles, Roxbury.
Whittier, George E., Groton.
Wilbur, George B., West Newton.
Wilder, Edward Baker, Dorchester.
Wilder, Henry A., Malden.
Willard, E. W., Newport, R. I.
Willcutt, Levi L., West Roxbury.
Williams, Aaron D., Boston.
Williams, Benjamin B., Boston.
Williams, Philander, Taunton.
Willis, George W., Chelsea.
Willis, Joshua C., Roxbury.
Wilson, Col. Henry W., Boston.
Wilson, William Power, Boston.
Winthrop, Robert C., Jr., Boston.
Wood, William K., West Newton.
Woods, Henry, Boston.
Wright, George C., West Acton.
Wyman, Oliver B., Shrewsbury.

ANNUAL MEMBERS.

Members of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Abbott, Samuel L., M D., Boston.
Allen, Charles L., Floral Park, N. Y.
Alles, William H., Hyde Park.
Anderson, George M., Milton.
Arnold, Mrs. Anna E., Roxbury.
Atkinson, Edward, Brookline.

Badlam, William H., Dorchester.
Barker, John G., Boston.
Benedict, Washington G., Boston.
Bigelow, Arthur J., Eastlake, Worcester.
Bigelow, Mrs. Nancy J., Southborough.
Bird, John L., Dorchester.
Bird, Mrs. Sarah Elizabeth, Roxbury.
Bliss, Benjamin K., East Bridgewater.
Bock, William A., North Cambridge.
Bolles, Matthew, Boston.
Bolles, William P., M. D., Roxbury.
Bouvé, Lander M., Brookline.
Boyden, Clarence F., Taunton.
Breck, Charles H., Newton.
Breck, Charles H. B., Brighton.
Brooks, George, Brookline.
Brown, David H., West Medford.
Butler, Edward, Wellesley.

Carpenter, Frank O., West Roxbury.
Carroll, James T., Chelsea.
Carter, Mrs. Sarah D. J., Wilmington.
Chase, Joseph S., Malden.
Chase, Leverett M., Roxbury.
Chase, Philip A., Lynn.
Cheney, Amos P., Natick.
Chubbuck, Isaac Y., Roxbury.
Clapp, Henry L., Roxbury.
Clark, John Spencer, Boston.
Clark, Joseph, Manchester.
Clark, Theodore M., Newtonville.
Clarke, Frederick E., Lawrence.
Collins, Frank S., Malden.
Comley, James, Lexington.
Coolidge, David H., Jr., Boston.
Coolidge, Sumner, Mount Auburn.
Cotter, Lawrence, Dorchester.
Cotting, Charles U., Boston.
Councilman, Prof. W. T., Boston.
Crosby, J. Allen, Jamaica Plain
Curtis, Joseph H., Boston.
Curtis, Louville, Tyngsborough.

Davis, Frederick, Boston.
Davis, Frederick S., West Roxbury.
Davis, Thomas M., Cambridgeport.
Dawson, Charles Jackson, Jamaica Plain.
Dimick, Orlendo W., Watertown.
Dolbear, Mrs. Alice J., College Hill.
Doran, Enoch E., Brookline.
Doyle, William E., East Cambridge.
Duffley, Daniel, Brookline.

Eaton, Warren E., Reading.

Endicott, Miss Charlotte M., Canton.
Ewell, Marshall F., Marshfield Hills.

Faxon, Edwin, Jamaica Plain.
Felton, Arthur W., West Newton.
Fenno, Warren, Revere.
Fisher, Sewall, Framingham.
Fitzgerald, Desmond, Brookline.
Fletcher, Fred W., Auburndale.
Forbes, William H., Jamaica Plain.
French, Charles G., Utica, N. Y.
Frost, Artemas, Belmont.
Frost, George, West Newton.
Frost, Varnum, Arlington.
Fuller, T. Otis, Needham.

Gibbon, Mrs. James A., Brookline.
Gill, Mrs. E. M., Medford.
Gilman, Hon. Virgil C., Nashua, N. H.
Grant, Charles E., Concord.
Grew, Henry Sturgis, Boston.

Hall, Charles H., M. D., Boston.
Hall, Stacy, Boston.
Hall, William T., Revere.
Hallstram, Charles W., Boston.
Hargraves, William J., Jamaica Plain.
Harris, Miss Ellen M., Jamaica Plain.
Harris, Frederick L., Wellesley.
Harrison, Thomas, Melrose Highlands.
Hartwell, Samuel, Lincoln.
Hatfield, T. D., Wellesley.
Henshaw, Samuel, West Brighton, N. Y.
Hersey, Alfred H., Hingham.
Hersey, Edmund, Hingham.
Heustis, Warren H., Belmont.
Hewett, Miss Mary C., Canton.
Hill, J. Willard, Belmont.
Hobbs, George M., Boston.
Hollis, George, South Weymouth.
Horton, Herbert A., Brookline.
Houghton, George S., West Newton.
Howard, J. W., Somerville.
Hubbard, F. Tracey, Cambridge.
Huston, Miss Katherine W., Roxbury.

Ireland, Robert D., Winthrop.

James, Robert Kent, Dorchester.
Jameson, G. W., East Lexington.

Keith, Miss Mary R., Washington, D. C.
Kemp, William S., Brookline.
Kenrick, Miss Anna C., Newton.

Lancaster, Mrs. E. M., Roxbury.
Lawrence, Henry S., Roxbury.
Lee, William W., Northampton.
Lincoln, Miss Agnes W., Medford.
Lomax, George H., Somerville.
Lombard, Richard T., Wayland.
Loring, Charles G., Boston.
Loring, John A., North Andover.
Loring, William C., Beverly.
Lothrop, Thornton K., Boston.
Loud, Miss Mary E., Roxbury.
Low, Hon. Aaron, Hingham.
Lowell, John, Newton.

Manda, W. A., South Orange, N. J.
Manning, A. Chandler, Reading.
Manning, J. Woodward, Reading.
Martin, William J., Milton.
Masten, Cornelius E., Roxbury.
May, F. W. G., Boston.
McDowell, Mrs. Mary, Cambridge.
McLaren, Anthony, Forest Hills.
McMullen, Edgar, Boston.
Meriam, Horatio C., D.M.D., Salem.
Merrill, John J., Roxbury.
Milman, William, Roxbury.
Moore, George D., Arlington.
Moseley, Frederick Strong, West Newbury.
Munson, Prof. W. M., Orono, Me.

Newton, John F., Roxbury.
Nicholson, William, Framingham.

Norton, Michael H., Boston.
Norton, Patrick, Boston.

Olmsted, Frederick Law, Brookline.

Park, William D., Boston.
Park, William P., West Boxford.
Parker, John, Newtonville.
Parker, Walter S., Reading.
Patterson, William, Quincy.
Peirce, George H., Concord.
Peterson, Ellis, Jr., Jamaica Plain.
Petremant, Robert, New York, N. Y.
Pickman, Dudley L., Boston.
Pigott, Thomas E., Winthrop.
Plimpton, Willard P., West Newton.
Power, Charles J., South Framingham.
Prichard, Joseph V., Dorchester.
Purdie, George A., Wellesley Hills.

Rich, Miss Ruth G., Dorchester.
Rich, William E. C., Roxbury.
Rich, William P., Chelsea.
Richards, Mrs. P. D., West Medford.
Robbins, Oliver R., Weston.
Robinson, Walter A., Arlington.
Ross, Charles W., Newtonville.
Ross, Henry Wilson, Newtonville.
Rothwell, James E., Brookline.

Saunders, Miss Mary T., Salem.
Sawtelle, J. M., Fitchburg.
Schmitt, Georg A., Boston.
Scott, Augustus E., Lexington.
Scudder, Samuel H., Cambridge.
Searles, E. F., Methuen.
Seaver, Edwin P., LL. D., Waban.
Sharples, Stephen P., Cambridge.
Shaw, Hon. Edward P., Newburyport.
Sheppard, Edwin, Lowell.
Smith, Archibald, Somerville.
Souther, Charles H., Jamaica Plain.
Southworth, Edward, Quincy.
Squire, Miss Esther A., North Cambridge.
Stearns, Mrs. Charles A., East Watertown.
Stearns, Charles H., Brookline.
Stevens, Miss Mary O., North Andover.
Stone, Joshua C., Watertown.
Storer, Charles, Providence, R. I.
Story, Miss Sarah W., Brighton.
Swan, Charles W., M. D., Boston.

Tailby, Joseph, Wellesley.
Talbot, Josiah W., Norwood.
Teele, William H., West Acton.
Terry, Rev. Calvin, North Weymouth.
Toby, Rufus T., Roxbury.
Travis, Charles B., Brighton.
Tyndale, Theodore H., Brookline.

Vaughan, J. C., Chicago, Ill.

Walsh, Michael H., Wood's Holl.
Warren, Samuel H., Weston.
Webster, Hollis, Cambridge.
Welch, Patrick, Dorchester.
Weld, Charles E., Roslindale.
Wells, Benjamin T., Newtonville.
Westwood, Thomas H., Jamaica Plain.
Wheeler, James, Brookline.
White, Maurice P., Roxbury.
White, W. Henry, Lowell.
Whitney, Joseph, Cambridgeport.
Whiton, Hon. Starkes, Hingham Centre.
Wilcox, George D., M. D., Providence, R. I.
Winter, William C., Mansfield.
Wolcott, Mrs. Henrietta L. T., Dedham.
Wood, Mrs. Anna D., West Newton.
Wood, Elijah A., West Newton.
Wood, E. W., West Newton.
Woodford, Joseph H., Boston.
Woods, Henry F., Boston.
Worthington, Roland, Roxbury.

Young, Arthur W., Hingham.
Young, Charles S., Newton Centre.
Young, E. Bentley, Boston.

Zirngiebel, Denys, Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXII.

Life Members.

The payment of thirty dollars shall constitute a Life Membership, and exempt the member from all future assessments, and any annual member, having paid all dues, may become a Life Member by the payment of twenty dollars in addition thereto.

Annual Membership.

Every annual member, before he receives his diploma, or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIII.

Withdrawal or Discontinuance of Membership.

Any member may withdraw from the Society, on giving notice to the Treasurer and paying the amount due from him. Any member who shall neglect for the space of two years to pay his annual assessment, after due notice from the Treasurer, shall cease to be a member. The Treasurer shall give notice of such withdrawals or discontinuances to the Secretary, who shall erase such members' names from the list.

The attention of Annual Members is particularly called to Section XXIII.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Joseph Maxwell, *elected in* 1830, *and* George W. Smith, *elected in* 1851.

Hon. George S. Boutwell, Groton.
H. W. S. Cleveland, Chicago, Ill.
Hon. Joseph S. Fay, Wood's Holl.
Joseph Jefferson, Buzzard's Bay.
Major L. A. Huguet-Latour, M. P., Montreal, Canada.
Col. Theodore Lyman, Brookline.
Joseph Maxwell, Rio Janeiro, Brazil.
Donald G. Mitchell, New Haven, Conn.
Hon. J. Sterling Morton, Secretary of Agriculture, Washington, D. C.
Baron R. Von Osten Sacken, Heidelberg, Germany.
Samuel B. Parsons, Flushing, N. Y.
Samuel R. Payson, Boston.
George W. Smith, Boston.

CORRESPONDING MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly reporting to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Alexander Burton, *elected in* 1829, S. Reynolds, M. D., 1832. *and* Francis Summerest (or Summerer), 1833.

Édouard André, Editor in Chief of the Revue Horticole, Paris, France.

Professor L. H. Bailey, Cornell University, Ithaca, N. Y.

Charles Baltet, Président de la Société Horticole, Vigneronne, et Forestière de l'Aube, Troyes, France.

Napoleon Baumann, Bolwiller, Alsace.

D. W. Beadle, 303 Crawford St., Toronto, Ontario.

Professor William J. Beal, Agricultural College, Michigan.

Prosper J. Berckmans, President of the American Pomological Society, Augusta, Ga.

Charles E. Bessey, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.

Dr. Ch. Bolle, Berlin, Prussia.

John Croumbie Brown, LL.D., Haddington, Scotland.

Professor J. L. Budd, Secretary of the Iowa Horticultural Society, Ames.

William Bull, Chelsea, England.

Alexander Burton, United States Consul at Cadiz, Spain, Philadelphia.

Isidor Bush, Bushberg, Jefferson Co., Mo.

George W. Campbell, Ex-President of the Ohio State Horticultural Society, Delaware, O.

Maxime Cornu, Director of the Jardin des Plantes, Paris, France.

Benjamin E. Cotting, M. D., Boston.

Daniel T. Curtis, Dorchester.

Rev. H. Honywood D'Ombrain, Westwell Vicarage, Ashford, Kent, England.

Robert Douglas, Waukegan, Ill.

Malcolm Dunn, Dalkeith, Scotland.

W. T. Thiselton Dyer, C. M. G., F. R. S., Director of the Royal Botanic Gardens, Kew, England.

PARKER EARLE, President of the American Horticultural Society, Cobden, Ill.

GEORGE ELLWANGER, Rochester, N. Y.

HENRY JOHN ELWES, F. L. S., F. Z. S., Colesborn, Andoversford, Gloucestershire, England.

WILLIAM G. FARLOW, M. D., Professor of Cryptogamic Botany, Harvard University, Cambridge.

B. E. FERNOW, Chief of the Division of Forestry, Department of Agriculture, Washington, D. C.

HON. ROBERT W. FURNAS, Ex-President of the Nebraska State Horticultural Society, Brownville.

CHARLES A. GOESSMANN, Ph. D., LL. D., Chemist of the Hatch Experiment Station of the Massachusetts Agricultural College, Amherst.

GEORGE L. GOODALE, M. D., Professor of Botany, Harvard University, Cambridge.

OBADIAH B. HADWEN, President of the Worcester County Horticultural Society, Worcester.

PROFESSOR BYRON D. HALSTED, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N. J.

J. H. HART, Superintendent of the Botanic Garden, Trinidad.

DR. F. M. HEXAMER, Editor American Agriculturist, New York.

ROBERT HOGG, LL. D., Editor of the Journal of Horticulture, London.

J. C. HOLDING, Ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.

REV. S. REYNOLDS HOLE, Rochester, England.

SIR JOSEPH HOOKER, K. C. S. I., The Camp, Sunningdale, England.

JOSIAH HOOPES, West Chester, Pa.

GEORGE HUSMANN, Napa, Cal.

WILLIAM J. JOHNSON, M. D., Fort Gaines, Ga.

CHARLES JOLY, Vice-President of the Société Nationale d'Horticulture de France, Paris.

DR. GEORGE KING, Superintendent of the Royal Botanic Garden, Calcutta.

PROFESSOR WILLIAM R. LAZENBY, Secretary of the Agricultural Experiment Station, Columbus, O.

MAX LEICHTLIN, Baden-Baden, Germany.

G. F. B. LEIGHTON, President of the Norfolk Horticultural and Pomological Society, Norfolk, Va.

VICTOR LEMOINE, Nancy, France.

J. LINDEN, Ghent, Belgium.

T. T. LYON, President of the Michigan Horticultural Society, South Haven.

DR. P. MACOWAN, Director of the Botanic Garden, Cape Town, Africa.

DR. MAXWELL T. MASTERS, Editor of the Gardeners' Chronicle, London.

GEORGE MAW, Benthal, Kinley, Surrey, England.

T. C. MAXWELL, Geneva, N. Y.

THOMAS MEEHAN, Germantown, Pa.

DR. CHARLES MOHR, Mobile, Ala.

DR. DANIEL MORRIS, C. M. G., D. Sc., M. A., F. L. S., Assistant Director of the Royal Botanic Gardens, Kew, England.

CH. NAUDIN, Antibes, France.

GEORGE NICHOLSON, Curator of the Royal Botanic Gardens, Kew, England.

WILLIAM PAUL, Waltham Cross, London, N.

PROFESSOR D. P. PENHALLOW, Director of the Botanic Garden, Montreal, Canada.

HENRY PROBASCO, Cincinnati, O.

P. T. QUINN, Newark, N. J.

CAVALIÈRE ENRICO RAGUSA, Palermo, Sicily.

D. REDMOND, Ocean Springs, Miss.

S. REYNOLDS, M. D., Schenectady, N. Y.

WILLIAM ROBINSON, Editor of The Garden, London.

EDGAR SANDERS, Chicago, Ill.

WILLIAM SAUNDERS, Department of Agriculture, Washington, D. C.

WILLIAM R. SMITH, Curator of the Botanic Garden, Washington, D. C.

ROBERT W. STARR, Port William, N. S.

DR. JOSEPH STAYMAN, Leavenworth, Kan.

WILLIAM A. STILES, Editor of Garden and Forest, Deckertown, N. J.

WILLIAM SUMNER, Pomaria, S. C.

FRANCIS SUMMEREST.

WILLIAM TRELEASE, Director of the Missouri Botanic Garden, St. Louis.

DR. MELCHIOR TREUB, Director of the Botanic Garden, Buitenzorg, Java.

H. J. VEITCH, Chelsea, England.

HENRY L. DE VILMORIN, Secretary of the Société Nationale d'Agriculture de France, Paris.

EXPERIMENT STATION REPORTS WANTED.

The Massachusetts Horticultural Society is endeavoring to collect complete sets of the Bulletins and other publications of all the Agricultural Experiment Stations in the United States and Canada. Those named below are wanting, and any person having a spare copy will confer a favor by addressing the Librarian of the Society, Horticultural Hall, No. 101 Tremont Street, Boston.

Alabama (Ag. and Mech. College Station). — Bulletins 4–6 (1884), 7–10 and 1–4 (1885), 5–9 (1886). 7th Annual Report, for 1894.

Alabama (Canebrake Station). — All Annual Reports later than the 3d, for 1890.

Arizona. — 4th Annual Report, for 1893.

Arkansas. — Bulletin 1. All Annual Reports later than the 4th, for 1891.

California. — Bulletins 32, 1878, and 1, 2, 3, 5, and 50, New Series.

Colorado. — Bulletins 3 and 36.

Connecticut (New Haven Station). — Bulletins 1 to 67, inclusive. Annual Reports for 1877 to 1883, inclusive, except that for 1878.

Idaho. — All Bulletins later than No. 9.

Indiana (Purdue Univ. School of Ag.). — Bulletin 1. College Reports 1 to 14, inclusive.

Kentucky. — Bulletin 10.

Maryland. — Special Bulletins G and K.

Michigan. — 6th Annual Report, for 1892–93. (Contained in Report of Michigan Board of Agriculture, 1893.)

Missouri. — Bulletins 9, 13, 15, 16, 19, 20, 25, 26, and 33 of Old Series. All Annual Reports since the 1st, for 1888.

New Jersey. — Bulletins 1, 4, 5, 15, 27, and 28.

New York (Cornell). — Annual Report, 1882–83 (Report of Agricultural Department of Cornell University).

North Carolina. — Bulletins 1 to 56, inclusive, and 69, 2d ed. Meteorological Division, Bulletin 2 (68*b*), and 2d and 3d Annual Reports, for 1888 and 1889. Special Bulletins 1 (77*a*) and 4 (82*a*). Weekly Weather Crop Bulletins 1–21, 1888; 1–24, 1889; 1-25, 1890; 2 and 4, 1891.

North Dakota. — 4th Annual Report, for 1893.

Ohio. — All Bulletins of First Series, except 16, 17, 18, and 19.

Pennsylvania. — Annual Reports for 1869, 1872, 1879–80, 1881, 1882, 1883, and 1884. [All issued by the State College.] Annual Report for 1895.

Rhode Island. — Part I. of both the 5th and 6th Reports of the College of Agriculture, for 1892 and 1893.

South Carolina. — All Bulletins of the Old Series (previous to 1888) on the work of the Experimental Farm of the South Carolina College. 3d Annual Report, for 1890, and 6th, for 1893.

Tennessee. — Annual Report for 1895.

Texas. — College Bulletins 1–5, 1883–1887. All Station Bulletins later than 39.

Virginia. — Bulletins 59 and 60.

West Virginia. — All Bulletins later than 44. Special Bulletin — Potash and Paying Crops, 1890. All Annual Reports later than the 3d, for 1890.

Ontario Department of Agriculture, Toronto. — Bureau of Industries. — Agricultural Returns to the Ontario Bureau of Industries, Nov. 1882 (5th), Aug. 1883 (7th), and Nov. 1887 (20th).

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1897.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1898.

☞ SEE LAST PAGE OF COVER.

TRANSACTIONS

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Massachusetts Horticultural Society,

FOR THE YEAR 1897.

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The following papers have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the "Boston Transcript." As here presented, the papers are printed in full, and the discussions, where it appeared necessary, have been carefully revised by the speakers.

The Committee on Lectures and Publication take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature, in the papers and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

J. D. W. French,
B. M. Watson,
N. T. Kidder,
Committee on Lectures and Publication.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 2, 1897.

A stated meeting of the Society was holden today at eleven o'clock, the President in the chair.

This being the commencement of the term of office of the new board of officers and Standing Committees, the President, FRANCIS H. APPLETON, delivered the usual annual address, as follows:

ADDRESS OF PRESIDENT APPLETON.

Fellow-members of the Massachusetts Horticultural Society:

We find ourselves in the same location and within the same building at the commencement of a new year, during which I shall continue, through your votes, to have the honor and responsibility of presiding for a second term, and of endeavoring to do my part, under our constitution, to perform the duties of the office.

One year ago today I said to you, in part, that its founders did not suppose "that this Society would exist to see the day when it had outgrown the arrangements which were made for it by their successors, upon this site, only thirty (now thirty-one) years ago." I now repeat that statement, as applicable today as then.

Your chosen officials have had this subject under consideration during the past year, and are still unable to present any recommendation, with a view to improving our home, for your favorable consideration. In this I believe your Committee to be unanimous.

In the city of Philadelphia there has been dedicated and opened, during the past year, a new fire-proof building for the Pennsylvania Horticultural Society, designed to promote the work in which we, of this Massachusetts Society, are all interested.

The land upon which the Pennsylvania Society has built was owned by William L. Shaffer, thirty-four years a member and seventeen years president, who, at his death in August, 1884, left his entire estate to his sister, who, in May, 1887, by deed of trust, placed the land and a building which had previously been used by the Horticultural Society in the hands of trustees and their successors, to hold forever for the benefit of the Pennsylvania Horticultural Society. In May, 1893, the hall was a second time destroyed by fire.

In the autumn of 1894, on approval of the Society, it was leased for thirty years by the said trustees to five gentlemen, who, as trustees for the bondholders, secured an issue of income bonds, bearing interest at three per cent, $200,000, with which, together with $25,000 insurance money, the new building has been built.

The uses to which that new building can be put seem to me to be uses for which a horticultural building can well be erected in this growing city of Boston, and meet a long-felt want; which, at the same time, would be of a plan best calculated to advance and promote the direct objects for which this Society was incorporated, *i.e.*, "for encouraging and improving the science and practice of horticulture."

In considering the future of our Society, it seems to me advisable to give prominence to our own needs by stating how similar needs have been met by our allies in Pennsylvania.

The Horticultural Building at Philadelphia is located centrally upon a lot of land two hundred by ninety feet, so situated that it is easy of access by carriage or street car. Some of its entrances are under cover, and all are well planned. Its offices, reception and ante-rooms are commodious, and will accommodate at least one thousand people. These, with a lecture hall and grand staircase hall, are on the first story. From the grand staircase one enters the large hall, seventy by one hundred feet, which has a vaulted ceiling at a height of thirty-five feet. This latter room will seat eleven hundred persons for concerts and lectures, and five hundred for banquets, and is admirably suited for large assemblies.

All these uses promote a market for horticultural products, and encourage advanced taste of both palate and mind, which helps to promote, the Society's chartered object.

The halls are well lighted from outside by day and by electricity at night, and are well ventilated. I have said that the building is rated as fire-proof.

At the west end of the large hall is a platform, below which, and upon a level higher than that of the first floor, are six small rooms. In the front part, and on the same level with the large hall, is a suite of rooms consisting of a small hall and two supper rooms, where suppers can be served when entertainments are in progress in the large hall, or all can be used in connection with the large hall. Serving-rooms are in the front part of this floor under a convenient balcony, which, by elevators, connect all of this floor with the kitchens, pantries, and china closets on the third floor.

While all that is thus described can add to the income and promote horticultural aims, the opening into one extensive promenade of all the space on the second floor, by a system of sliding partitions or folding doors, makes a superb opportunity to display plants, flowers, fruits, vegetables, etc., in a most complete way.

An elevator, the floor of which can form a section of the floor of the large hall, delivers plants of any reasonable height, and all other exhibits, conveniently. Rubber-tired cars can be used to bear them to any part of the first or second stories.

A basement that is largely above ground affords ample accommodation for floral and other horticultural business, and also for the Society's storage, dynamos, boilers, etc.

The Pennsylvania Society's Library appeared to be smaller than ours, but a new building, whether on this site or some other, or our present building remodelled, can always be planned to meet the needs in this direction.

Whatever may be done in the future to improve our home facilities, may we be able to secure as useful a home for our chartered purpose as has the society to which I have been calling your attention secured to promote Pennsylvania horticultural interests.

Are we now, by the liberal expenditure for prizes, advancing the science and business of horticulture as much as in our power? is a subject that we should all take into serious consideration.

To carry on our work we must have income, and the larger our income the greater must be our success on the lines for which we are incorporated; and, provided we apply it most wisely and conservatively, it will continue to us in increasing quantity.

It would not, in my opinion, be lessening our benevolent work, but rather increasing it, to charge a reasonable fee to non-members visiting our exhibitions, subject to a judicious issue of the usual complimentary passes.

Our Society should be benevolent to the public by allowing the non-members to contribute toward the good that the Society aims to do for the public and horticulture in general.

If our exhibitions are to increase in horticultural profit to those who view them, and the prizes are to continue in their present or increased liberality to those who win them, the non-member beneficiaries can, and in reason will, be ready to contribute toward the success and perpetuation of our work.

Our Library is valuable, and appeals to lovers of horticulture to make greater use of the books upon its shelves. Considerable work is done and money spent, annually, to keep it in an advanced condition, and we hope that all possible good to the State shall come from its being well used. To make its value known is one way to increase its usefulness.

The lectures given during the past season by the Society were generally of much value, and their usefulness was promoted as much as was possible by the help from lantern-slide pictures.

We were fortunate in having with us, as lecturers during the season of 1897, officers of the Department of Agriculture at Washington, and professors from universities and colleges, as well as men of practical experience, and we can congratulate the Committee and ourselves upon the result.

The small attendance at our adjourned meetings would seem to indicate either a decreasing interest in our work, or that our members believed that our business meetings were too frequent. I have been led to examine our constitution to see by what authority our monthly business meetings are held. I find only four stated meetings required by our constitution, *i.e.*, the first Saturdays in January, April, July, and October, with provision for calling other meetings when deemed necessary.

The Executive Committee are to meet monthly, and to report

on the first Saturday of each month, with the names of such persons as they recommend for election. Judging by the present custom in clubs and associations, it is a fair interpretation of this last provision that such names are to be either kept on file, or posted in the building by the Secretary until the next stated meeting, when they shall be voted upon by the Society.

I believe that it may increase the interest in the Society to follow the plan which is thus suggested by our constitution, rather than to adjourn our stated meetings with very little occasion, as has been simply a custom. I believe this will be returning to a former custom.

During the past year the Society has lost by death 33 life members, and gained 24; and has lost by death 13 annual members, and by commutation to life membership 1; while 5 annual members have resigned, making a loss of 19 annual members, with a gain of 18.

The use of the library appears to have decreased, and I suggest that if the Committee on the Library shall make a rule limiting the time during which books can be kept from the library room, such a rule might help develop the usefulness of the library. The value of the library should become better known to the students of horticulture, and it is hoped that such may result.

I commend to your careful consideration the several reports of your Standing Committees, from which you will gain information as to those departments, and learn of the suggestions therein made for the good of the Society.

Those reports will be printed in the Transactions, which I hope will be issued soon, in order that their usefulness to you may thus be the greater. With the intelligence that can be found in our printing offices today, those can be found who will assume the responsibility of technical work, and thus expedite to our benefit in this case, for example, what might otherwise cause much delay under old-fashioned methods.

The interest in the mushroom, a most nourishing food when the edible species are known to the gardener, has grown largely within the past few years, and a more general knowledge among our people of what are the edible species, and what are their characteristics, is desirable.

I have asked Mr. Hollis Webster, an expert, to give me a few points to incorporate into my address, but as he has so well

expressed the views of the mushroom lover in a letter to me, I shall present it as being what I would call to your attention.

Hoping that this new year may bring profit and happiness in all due quantity to our members, and expressing my appreciation of the honor of again serving you in this chair, we will now continue the usual order of business.

The appropriations previously recommended by the Executive Committee for the year 1897 came up for final action, and were unanimously voted, as follows:

For Prizes and Gratuities:

For Plants	$2,000
For Flowers	2,600
For Fruits	1,800
For Vegetables	1,200
For Gardens	500

Total for Prizes and Gratuities for the year 1897, $8,100

These amounts are the same as last year, except that for Vegetables, to which $50 is added.

The following appropriations were also recommended, all being the same as last year:

For the Committee on Lectures and Publication, this sum to include the income of $50 from the John Lewis Russell Fund	$300
For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee	400
For the Library Committee for the purchase of magazines and newspapers, binding of books, and incidental expenses of said Committee	400
For the Committee on School Gardens and Children's Herbariums, this sum to cover all incidental expenses of said Committee, and to be paid through the usual channels	250

The Executive Committee further recommended that the sum of $38 be transferred to the Flower Committee from the unexpended balance of the appropriation for the Fruit Committee, to cover the deficit in the awards made by the Flower Committee in 1896, the same not to establish a precedent.

The Executive Committee also reported that they had procured

an act in addition to the act incorporating the Society, empowering it to hold real and personal estate to an amount not exceeding one million dollars.

The Executive Committee reported the appointment of Charles E. Richardson as Treasurer and Superintendent of the Building, and recommended to the Society to appropriate $1,500 for his salary. The Committee also reported the appointment of Robert Manning as Secretary and Librarian, and recommended the appropriation of $1,500 for his salary.

These reports were unanimously accepted, and the recommendations therein adopted, and the appropriations recommended were voted.

John G. Barker, Chairman of a Committee to prepare a memorial of the late Samuel G. Damon, reported as follows:

The Committee appointed to prepare a memorial of our late associate, Mr. Samuel G. Damon, respectfully report that they have attended to their duty, and present the following preamble and resolutions:

Whereas, It has pleased our Heavenly Father in his wise providence to remove from our number Mr. Samuel G. Damon, we desire to place on record our appreciation of his worth and labors.

Mr. Damon had been a member of this Society for thirty years, and during that time was a constant contributor to the exhibitions. Fruit was his specialty, and he excelled as a cultivator of hardy grapes and pears, and carried off many first prizes as evidence of his skill in this department of horticulture.

In all the walks of life he was an upright and honorable man, and a perfect gentleman, and while we miss his presence among us his memory and influence still live. Therefore be it

Resolved, That we deeply mourn the loss of this most worthy member, and sympathize with his family in the still greater loss they have sustained.

Resolved, That this preamble and resolutions be spread upon the records, and that a copy be sent to the family of the deceased.

JOHN G. BARKER,
E. W. WOOD,
C. F. CURTIS,
} *Committee.*

The memorial was unanimously adopted.

E. W. Wood was granted further time to prepare his report as Delegate to the State Board of Agriculture.

On motion of Ex-President William C. Strong, a vote of thanks to the President for his annual address was unanimously passed, the question being put by the Secretary. The President expressed his pleasure at the appreciation by the Society of his efforts to serve it.

E. W. Wood, Chairman of the Committee on Fruits, read documents looking to legislation for the prevention of the disease of the peach known as "yellows." A motion that the Society take part in the effort to secure such legislation was negatived, after discussion by several members.

The President read a letter from the Executive Committee of the Boston Mycological Club, thanking the Society for the hospitality extended to the Club, and expressing their high appreciation of its value; without it they would hardly have been so successful as they were in extending so widely the knowledge of this branch of the Society's work.

JOHN MUTCH, of Brookline, and
HENRY S. ADAMS, of Dorchester,

having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected.

The President announced that the first of the series of weekly lectures for the present season would be given on the next Saturday, by Professor George L. Goodale, of Harvard University; subject, "Tropical Horticulture," with stereopticon illustrations of the principal Economic Plants of Hot Climates, and that the lectures would be free to all.

The meeting was then dissolved.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 9, 1897.

A meeting for Lecture and Discussion was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair. The lecture was on

Tropical Horticulture, with Illustrations of the Principal Economic Plants of Hot Climates.

By George Lincoln Goodale, Professor of Botany in Harvard University, Cambridge.

Tropical horticulture is likely to attract more and more attention at the hands of our younger and more enterprising students of the subject of botany as increased facilities are afforded for gaining an acquaintance with the capabilities of the tropics. And with this increase of opportunity there will probably come increased interest on the part of investors and business men in different lines of commerce depending on the products of tropical agriculture and horticulture. As some now present are aware, considerable increase of interest in this matter has already been manifested in this vicinity, and already a good amount of capital has gone forward in lucrative undertakings of this nature.

Therefore it will not be out of place in a meeting in this hall, devoted to the advancement of horticulture in general, to present some of the phases of this subject and call attention to some of the requisite cautions which possibly may be forgotten. It must be remembered that the subject should be most carefully examined by all those who intend to engage in tropical pursuits, and the numerous works of a practical character on the subject leave little excuse for such persons to be ignorant in regard to conditions which will confront them in the tropics. Referring, then, all inquirers who have in mind undertaking tropical horticulture to the treatises of a practical character, many of which can be seen in the excellent library of the Massachusetts Horticultural Society, I shall pass at once to a brief consideration of a few salient points of some general interest, and illustrate the subject by numerous photographs of tropical vegetation.

Our cursory survey will be confined to the moist tropics, and will not touch the interesting matter of the deserts, reclaimable and irreclaimable. The tropical climate which we are to look at is best exemplified in the equatorial belt. The climatic conditions of this zone have been most graphically described by Belt, Bates, Charles Kingsley, and Alfred Russell Wallace, whose works are absorbingly interesting from every point of view.

From the works of one of these authors I shall cite a description of a tropical day. And as you examine the peculiarities of an equatorial day, you will remember that near the Tropic of Cancer and the Tropic of Capricorn the climate is by no means as equable as that near the Equator. Wide ranges in temperature and rain may come in with the changing seasons, and annual vegetation may go down even to the verge of extinction, as is now the deplorable case in parts of the south and middle of India. Bearing this in mind, we may consider the equatorial day. I quote from Mr. Bates, the naturalist in Nicaragua. He begins with the morning, in which there is no twilight. Day is not ushered in by dawn as with us.

"At that early period of the day [the first two hours after sunrise] the sky was invariably cloudless, the thermometer marking seventy-two degrees or seventy-three degrees Fahrenheit; the heavy dew of the previous night's rain, which lay on the moist foliage, becoming quickly dissipated by the glowing sun, which, rising straight out of the east, mounted rapidly toward the zenith. All nature was fresh, new leaf and flower-buds expanding rapidly. . . . The heat increased hourly, and towards two o'clock reached ninety-two degrees to ninety-three degrees Fahrenheit, by which time every voice of bird and mammal was hushed. The leaves, which were so moist and fresh in early morning, now became lax and drooping, and flowers shed their petals. On most days in June and July a heavy shower would fall sometime in the afternoon, producing a most welcome coolness. The approach of the rain-clouds was after a uniform fashion very interesting to observe. First, the cool sea-breeze which had commenced to blow about ten o'clock, and which had increased in force with the increasing power of the sun, would flag and finally die away. The heat and electric tension of the atmosphere would then become almost insupportable. Languor and uneasiness would seize on everyone, even the denizens of the forest betraying it by their motions. White clouds would appear in the east and gather into cumuli, with an increasing blackness along their lower portions. The whole eastern horizon would become almost suddenly black, and this would spread upwards, the sun at length becoming obscured. Then the rush of a mighty wind is heard through the forest, swaying the tree-tops; a vivid flash of lightning bursts forth, then a crash of

thunder, and down streams the deluging rain. Such storms soon cease, leaving bluish-black, motionless clouds in the sky until night. Meantime all nature is refreshed; but heaps of flower-petals and fallen leaves are seen under the trees. Towards evening life revives again, and the ringing uproar is resumed from bush and tree. The following morning the sun again rises in a cloudless sky; and so the cycle is completed; spring, summer, and autumn, as it were, in one tropical day. The days are more or less like this throughout the year. A little difference exists between the dry and wet seasons; but generally the dry season, which lasts from July to December, is varied with showers, and the wet, from January to June, with sunny days. It results from this, that the periodical phenomena of plants and animals do not take place at about the same time in all species, or in the individuals of any given species, as they do in temperate countries."

It is under conditions like these that the tropical cultivator has to live and carry on his work. The enervating influence of the climate upon a resident of the cooler zones is very marked, but with proper precautions as to living according to the stern rules of hygiene, life can be made very safe.

[At this point Professor Goodale introduced on the screen many stereopticon views of the dominant vegetation of the tropical climates, both north and south of the equator. The description of these views obviously cannot be given in this report.

The lecturer then proceeded to the consideration of some of the more important food plants of the tropics and sub-tropics, and their cultivation.]

Tropical cultivation of food plants is interesting from the ethnological standpoint. In warm climates where men can easily procure enough food to sustain life there is little incentive to exertion. If a small group of cocoanut palms and a few banana plants yield all the food one wants, why should any pains be taken, for instance, to raise rice? However, the natives of hot, moist climates do attend to the cultivation of a few food plants, one of the reasons being that they wish to vary the monotony of diet.

Many tropical products reach the markets of the world directly from the wild plants, but many of these plants are coming more and more under cultivation. The cultivation is, as can easily be understood, largely under the stimulating influence of

foreigners in these hot climates. Their enterprise, such as it is, lies at the basis of nearly all such cultivation of tropical crops.

Among the more commonly cultivated tropical products are spices, a few palms, textile plants, sugar-cane, certain varieties of tobacco, a few coloring matters, and many food plants. A few of these plants are now to be reviewed, and we may begin with the food plants.

Rice. — As raised in Ceylon, the land in which rice is to be planted is laid out so as to be saturated with water as required. The soil, being covered with a few inches of water, is stirred up by implements, or by driving bullocks hither and thither over it. In this loosened soil the seeds are placed and the quickly grown plants, with their tender green shoots, soon give the field a beautiful appearance. By and by the nodding heads show that the grain is growing heavy, but the vigilance of the cultivator does not relax. The ground is frequently saturated and search is made for the enemies of the plant. When the harvest comes the laborers secure the crop mostly by hand, as the grains are so easily detached that great care must be taken to grasp each cluster firmly before it is cut off. The rice is then husked and the dark brown grains become the beautiful white ones we know so well. In the Botanical Museum at Cambridge these processes are illustrated by photographs and the products are shown in all stages. Near by is another collection which at this time possesses great pathos — that of the famine-grains of India. Only the well-to-do can use rice, and cheaper grains are the food of the poor. But this year these have failed and a terrible famine is approaching parts of middle India, and before many months have gone, thousands will have died of starvation. The reason for this is that these people live just north of the equable equatorial belt, where the climatic conditions are unfavorable.

Coffee. — The coffee of commerce is raised within the tropics. Given by Arabia to the Malayan Archipelago and to parts of India and Ceylon, it has generally flourished. In Ceylon, however, it has had an almost fatal check from a destructive fungus and an equally destructive insect. The coffee plant at a distance sometimes resembles one of our Viburnums, but often takes the shape of a tree. Approaching, one sees the glossy dark-green

leaves, white flowers, and forming fruit. The trees, which are placed far enough apart to give room for gathering the ripe berries, require little care beyond keeping the ground clear at their base and removing any scale or other insects. When ripe the berries are gathered and "pulped." The seeds are generally two, with flat faces which come together. Sometimes only one seed ripens, and becomes round. It is then called "pea-berry" or "male-berry." These seeds are next separated from a parchment-like membrane which clings to the interior cleft, and after drying are ready for shipment.

Tea. — The different varieties of the tea plant are probably all referable to two species of Camellia. In hot climates like Ceylon it is possible to get an excellent product at less risk of injury, and cheaper, as to mere raising, than in China or Japan. But it is subsequent treatment which largely controls the price. The plants must be good, to start with, and must have good soil. When ready for the first picking the laborers snip off with thumb and finger the tips of the branches. When the bush is thus stripped it is ready to have the axillary buds start out and give new growths of fresh tips, and so on, a new picking being possible as often as the shoot is ready. The picked tips are brought to the factory and dried, and prepared to constitute green tea. Nowadays it is more common to let the leaves wilt a little, and undergo a process of change which is improperly but very generally called "fermentation," by which they become much blackened. They are then rolled by ingenious machinery and carefully dried. This is a very brief account of the usual process now adopted in Ceylon and parts of India for the preparation of certain forms of black tea. In Ceylon and India it is possible to have a good many "flushes" of fresh shoots and tender leaves during the year, whereas in more northern regions the number of pickings is much less. Obviously the most costly factor in the production of tea is the labor in picking it. This renders it practically impossible to cultivate tea profitably under existing labor conditions in our own South.

At the present time tea is seldom adulterated. The very cheap teas in the market are chiefly those which have been injured by keeping, or have suffered in some way during manufacture or transportation. Besides them, there are good cheap teas which are simply from coarser leaves.

Cacao. — Chocolate plants, as we shall now for convenience denominate the Cacao trees from which chocolate is prepared, were originally carried from America to the Old World. They are now cultivated in many parts of the eastern tropical belt, as well as in Central and South America and the West Indian Islands. The plant demands rich soil and a good deal of shelter. One of the most interesting features of this plant is the coming out of the blossoms and fruit on the older parts of the stems. After the fruits are gathered they are opened and their almond-like seeds are spread out for the removal of a part of the pulp. They then undergo a kind of heating process, popularly and not very improperly called "fermentation." The seeds freed from the still clinging, but now rather dry pulp are ready for shipment.

[The cultivation of the banana and its allies and the treatment of palms for the best yield of fruits were next considered at much length, after which the subject of spices came up. The lecturer then spoke of the life of the tropical horticulturist, noting his fondness for plants strange to his own surroundings. He enumerated the principal annoying weeds of the tropics, especially Mimosa and the tuberous species of Oxalis.]

Ginger, Annotto, Curcuma, and a few other species were studied by me in a plantation where Cacao was being successfully cultivated. The work requires a large margin of capital, energy, patience, and health. The tropical cultivator, especially he who has large interests, is subjected to a heavy strain in such a climate. There are perils from invasions of insects and fungi to be guarded against. There are constant improvements in varieties, eagerly seized by competitors, and these must be met. The delights, however, are many, and are attractive to certain temperaments. Nature is at its best in the tropics; life is full to the brim. Though there is not the keen zest in sports and study which is gained from the crisp air of a colder climate, still one can retreat to the hills to gather fresh strength for a new lease of life in the plains. For the children of the English-speaking planter such retreat is absolutely necessary, at short intervals.

If now, in brief résumé, we reduce this complicated question to its lowest terms, we see that tropical horticulture has this remarkable peculiarity: it is conducted under conditions wholly favorable to the life of plants. But just here lies the peril. What is good for one plant is, generally speaking, good for another, and

hence the cultivated plants thrive luxuriantly, but so do weeds and foes. This is illustrated in a striking manner by the growth of Coffee in Ceylon. Everything favored the Coffee plant. Nature was in every way most propitious, but the conditions were favorable also to destructive fungi, and these began their disheartening work. The most destructive of these, here and there assisted, as I have already said, by a destructive insect, ravaged the plantations so completely that the excellent Ceylon Coffee became almost lost to commerce.

It is therefore warfare of a most unrelenting kind which man must wage against the foes of cultivated plants in the tropics. He must at every point aid his protégés which have been rendered almost completely helpless by long-continued assistance from man. When the hand or aid of man is withdrawn, the cultivated plant either falls an easy prey to its foes or it relapses into a sort of quasi-defence, which often suggests the wild condition from which it sprang.

While, therefore, there is very much to encourage the novice in tropical horticulture there is very much that is preëminently discouraging. Tropical horticulture is far from being a sinecure. It demands earnest study of the conditions of plant life in all its relations, and it requires, also, a knowledge of the difficulty of getting good work done under tropical skies. Under exceptional conditions good work is done by natives, but as a rule they are apathetic and it is hard to secure faithful service. The young man who leaves a northern home for tropical venture must make up his mind to hard work under unfamiliar conditions. With this steadily in mind such ventures, under the precautions referred to, can be reasonably successful.

[The lecture was illustrated throughout by stereopticon views, chiefly of Ceylon, the Straits settlements, Java and the Malayan Archipelago, together with some of the newer plantations in Northern Queensland and Polynesia. Professor Goodale also referred to a Chinese book on the cultivation of Rice, in the Library of the Horticultural Society, with plates giving a vivid idea of the cultivation of that grain in China.]

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 16, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President CHARLES H. B. BRECK in the chair. The following lecture, which was fully illustrated with stereopticon pictures, was delivered:

THE STRUCTURE AND CLASSIFICATION OF MUSHROOMS.

By HOLLIS WEBSTER, Secretary of the Boston Mycological Club, Cambridge.

Whatever may be the cause of the present popular interest in mushrooms, it is evident not only to botanists, but to casual readers of the monthly periodicals and of the daily press, that within a few years this interest has grown largely, and that it is spreading widely. Its manifestations are various and unmistakable; but most of them have taken the form of demands for information and of the responses of those who have been willing to give it. Three years ago, for instance, there appeared three responses to this demand, one from an artist,[1] whose nature studies have made him popularly known; one from the State Botanist of New York,[2] who has for thirty years given special attention to the subject; and one from the Professor of Cryptogamic Botany at Harvard.[3]

Most of the numerous articles that have recently appeared have been concerned with showing the difference between edible and poisonous kinds of mushrooms (or toadstools, which are the same thing), and have been addressed to the general public. There are, however, many persons who wish to know something about mushrooms as plants, and perhaps to engage in limited studies concerning them. These people generally lack a knowledge of the elementary facts concerning structure and classification that would make easy an attack upon the literature of the subject. To such would-be students of a small part of the field of mycology this lecture is addressed in the hope that it may be of some assistance.

At the outset it will be well to come to an understanding as to the term *mushroom* itself. In every-day language it usually

[1] W. H. Gibson, in "Harper's Monthly Magazine" for August, 1894.
[2] C. H. Peck, in the "Cultivator and Country Gentleman," May 31–Sept. 20, 1894.
[3] W. G. Farlow, in "Garden and Forest," Jan. 24–Feb. 28, 1894.

means the sort of fleshy fungus that is good to eat, and particularly — to some people only — the common pasture kind. A *toadstool*, on the other hand, means something poisonous, or at least to be avoided. As a matter of fact, no distinction can be made between the two terms, though the term toadstool is more comprehensive, for it may be used to include the common pasture mushroom and all other fungi whose form is in general the same. Both terms are also loosely applied to other kinds, even to such forms as Puff-balls and Stink-horns.

If we look at a common mushroom of the pasture or the market, we see that it may be easily divided into two parts, an upright stalk, called the *stipe*, and a flat, expanded portion, the *cap* or *pileus*. Attached to the under side of the cap are membranous plates, the *gills*, or *laminæ*, radiating from the top of the stipe to the edge of the pileus. The upper part of the gills is attached to the lower surface of the cap, and their lower edges, which are usually very thin and rather sharp, hang free. In the mushroom that we are examining there is a space between the crowded inner ends of the gills and the top of the stem. In other kinds of mushrooms we may find the same condition of things, or it may be that the gills reach the stem and are attached to it, or even run down upon it as ridges, which in some cases end abruptly and in others are gradually reduced to mere lines. Upon the gills are borne in countless numbers the spores — exceedingly minute bodies, which, as it is their office to germinate and grow into new mushroom plants, may be roughly compared to seeds. The mushroom, in fact, as we see it, is nothing but a contrivance for the production and dissemination of the spores. The arrangement of the gills gives an enormous spore-bearing surface, whence the spores are carried by the wind or by insects, or drop to the ground below. If the cap of a fully grown mushroom be cut from the stem and laid, gills downward, on paper under a tumbler or other cover to keep draughts away, there will be found on the paper after a few hours — sometimes in a very short time — a layer of spores, making a negative print of the gills. In the common mushroom this print will be of a dark brown — almost a purple brown — the color, it will be noticed, of the gills at maturity, for the gills usually take the color of the spores.

Stem, cap, and gills are characteristic parts of most of the fungi commonly called mushrooms or toadstools. There are

other structures, however, peculiar to certain groups. These are a *volva*, a *ring*, and a *veil*. Of the volva, or sheath, characteristic of the poisonous Amanita, a description will be given presently. The common mushroom does not possess it, but does show us a ring and veil.

If we look at a young specimen that has not been long above ground and is still in its compact, rounded form, called by mushroom-growers a *button*, we shall see no gills on the under side of the cap. Indeed, the mushroom may sometimes grow to nearly its full height before they are visible. The reason is easy to see, for stretching unbroken from the edge of the unexpanded pileus to the stem is a delicate membrane called the veil. As the pileus expands, the veil is torn. Shreds of it, perhaps, cling to the edge of the cap, but most of it remains, encircling the stem and thus forming a ring, — a structure the appearance and size of which vary in the different sorts of mushrooms which possess one.

In the genus Amanita, for instance, there is a conspicuous veil. Moreover if you will look at the base of the stem, you will see something else — something like a membranous bag or sheath, from which the stem emerges. Now, when a young Amanita pushes up from the ground, this sheath or bag, technically the volva, encloses the entire plant. As the cap and stem press upward, the volva is ruptured at the top. In the mature plant its remnants are to be found at the base of the stem and sometimes in scattered scaly fragments on the top of the cap. The volva is not in every case so conspicuous as in the example first shown. In others it is reduced to a ridge running round the swollen base, or even to scales. Since the base of the plant is often below the surface of the ground, and the stem breaks easily, care must be used in gathering specimens if the volva is to be secured intact.

The structures so far spoken of are easily seen, but there is much more to a mushroom than this.

You have been told that a mushroom is simply a contrivance for bearing spores. It is thus comparable to the fruit of a flowering plant, which develops and contains the seeds. Where, then, you will ask, is the vegetative part of the plant, the part that absorbs the nourishment and does all the preparatory work of which the growth of the mushroom itself is the result? In other

words, what sort of a plant develops from a spore and where does it live? If you could follow, as you may under a microscope, the germination of a spore, and the stages of growth which follow, your eyes would give you the answer to the first part of this question. You would see the minute spherical or ellipsoid bodies, when supplied with the requisite moisture, burst and put forth slender colorless threads called *hyphæ*. These in time branch again and again, extending constantly in length to form what is called the *mycelium*, or vegetative part of the plant. When such threads are massed together in strands, forming white lace-work or cottony bunches, they are easily found in the substratum on which the fungus grows — in rotten wood, for instance, or in a heap of leaves, or other decaying vegetable matter. In such places the mycelium spreads over or permeates the substance from which it draws its food supply. For fungi do not elaborate their food from raw materials as do the plants that have green coloring matter, but are dependent upon other vegetable or animal organisms, either living or dead; that is, they are parasites, or saprophytes.

What is known by mushroom-growers as the *spawn* consists of a dried compressed portion of a mushroom bed, generally mixed straw and horse droppings, which is permeated by the mycelium. In this condition, in the form of flakes or bricks, it may be transported, and will keep its vitality for months, active growth being for the time arrested. As a rule, then, when mushroom beds are started, it is the mycelium or spawn which is planted — not the spores. When the proper conditions of warmth and moisture are supplied, growth is resumed, and the threads, lengthening, branching, and anastomosing, very soon spread throughout the bed.

It is plain, then, that the mushroom plant for most of its life is out of sight, and consequently not familiarly known. To this fact are due many erroneous notions about the origin of mushrooms themselves. When the time has come for the plant to produce its fruit, there form at various points in the mycelium small masses of densely branching interwoven threads, which in time enlarge to an appreciable size. Each of these masses is the beginning of a button, or nascent mushroom. An examination of buttons in various stages of growth, by means of thin sections brought into the field of a compound microscope, shows pretty clearly the part played by the hyphæ in the mushroom proper, the

substance of which is made up of the compacted and closely interwoven threads and their branches. Along certain radiating lines is formed the framework of the gills, which in the developed mushroom is called the *trama*. Just below the gills an air space appears, the outer wall of which becomes the so-called veil. Lastly, upon the surface of the gills develops a layer of cells standing side by side like the single threads in the pile of velvet or in the surface of an Oriental rug.

With these cells we have a special concern. Taken together they form the *hymenium*, the spore-producing tissue, which, folded like a fan, is applied to both sides of the gill-plates. A section through a gill shows us this layer. Each one of the club-shaped spore-bearing cells composing it is called a *basidium*. Each basidium bears four spores on minute stalks.

So far we have dealt exclusively with gill-bearing mushrooms, a group to which as a whole is given the name AGARICINI. There are other common kinds in which also basidia and spores are developed on an exposed hymenial surface. The hymenium is disposed in different ways. In one group, a large one, it lines the inside of small tubes which are fastened vertically, with the open mouths downward, in a closely packed mass on the under side of the pileus; this is the group of POLYPOREI. In a third group, the HYDNEI, it covers the surface of spines, teeth, or other protuberances. In a fourth it is smooth, without distinctive feature, evenly spread over one or both sides of the tough, or coriaceous, thin body of the plant; this is the character of the THELEPHOREI. In a fifth group, the CLAVARIEI, the plant is tender, fleshy, erect, and often densely branching, bearing the hymenium on all sides of the tips of the branches. Last are placed the rather shapeless, gelatinous TREMELLINEI, which shrivel when dry, and swell again with moisture; in these the hymenium covers the outer surface. From the similar nature of the hymenium and its exposure in these six groups they are classed together as the HYMENOMYCETES. To this natural class, "vasta Fungorum classis," as it was called by Fries, whose treatment of it still remains the basis of later classifications, belong most of the fungi commonly termed mushrooms or toadstools.[1]

[1] A good systematic account of the class as it appears in Great Britain, a work which in the absence of one specially adapted to this country is exceedingly helpful to a student, is Stevenson's "Hymenomycetes Britannici."

This class, however, does not include all the fleshy fungi, or even all those in which there is a hymenium with spore-bearing basidia. In a second class, much smaller, there is a similar method of fruiting; but the hymenium is not exposed, at least at first. A common puff-ball is the best example. A microscopic examination of the interior of a puff-ball shows that it is composed of a mass of chambers the walls of which are covered with basidia, the similarity of which to those in the class first treated is very plain. The chambers, however, are partly filled with branching threads, together called the *capillitium*. When the puff-ball is ripe and breaks open at the top, it is found that the chamber walls have become disintegrated and that the disconnected threads of the capillitium are left, together with an immense collection of spores, all in a dry state and ready to be caught by the first breath of wind. From the shape of the fruiting mass in the puff-ball and allied forms this class is called the GASTEROMYCETES. Since the class is small, our botanists have been able to describe most of our species, at least those of the Eastern part of the United States; and fairly exhaustive systematic accounts of them are to be found in the papers of Burt, Morgan, and others on the Phalloids or Stink-horns, and of Peck, McBride, Morgan, and others on the Puff-balls.

Fructification by means of spore-bearing basidia unites these two classes, together with others composed of less conspicuous fungi, under a still more comprehensive name, that of BASIDIOMYCETES.

There still remain a few mushrooms not included in the groups spoken of, namely, the *Morels*, *Helvellas*, and *Pezizas*. The first two are stalked, and roughly resemble the familiar Agarics; the last are shallow cups or fleshy expansions. A word as to the form of their fructification must suffice. Examination under a microscope of a bit of the outer or upper surface of one of these plants will reveal structures at first sight much like those in the Basidiomycetes. A mat of crowded slender cylindrical cells is seen covering the surface; none of these cells, however, bear spores on their tips. Instead, some of them — not all — contain spores in their interior. Each is, in fact, a little enclosure, called an *ascus*, and if one that is mature be separated from the rest, it will readily be seen to contain eight — almost invariably eight — spores. At the proper time these escape from the asci,

sometimes suddenly and myriads at once. From the surface of a Peziza, for example, as you look at it, there comes a little puff of smoke as the ejected spores are shot into the air to be blown away in a tiny cloud. Pezizas, Helvellas, and Morels are some of the *Discomycetes*, a class excellently treated for Great Britain by Phillips. Multitudes of fungi besides the Discomycetes have a fructification which consists of asci, and the comprehensive name for all of them is ASCOMYCETES.

Most of the mushrooms gathered by the increasing number of fungus hunters, at least by beginners in the study, belong to that class of Basidiomycetes called Hymenomycetes. Among these an Agaric is at once recognized by its gills; a Boletus or Polyporus by its pores; a Hydnum by its tooth-like projections; a Clavaria by its coral-like appearance; and a Tremella by its gelatinous nature. So far identification is a simple matter; but to go farther and decide upon the species requires close study, accurate observation of details of structure, ability to interpret published descriptions, and most of all experience. Many of you know well enough the difficulties you meet in "running down" a flowering plant in Gray's Manual — difficulties which arise often from incomplete knowledge of the structure of the plant, but sometimes from the lack of sharply defined and conspicuous characters in the species itself. The same difficulties meet you in the determination of mushrooms, aggravated by the lack of a Gray's Manual and not infrequently by incomplete or misleading descriptions in the books available.

The most frequent puzzles in identification are among the Agaricini, or gill-bearing mushrooms, whose numbers enormously exceed those of any others you are likely to collect. Since for the most part they are built on the same general plan, and resemble one another at first sight much more strongly than they differ, the task of separation demands close scrutiny and a practised eye. Every detail of structure must be noted: the shape, surface, color, and markings of the cap; the thickness and character of the flesh; the color, shape, and method of attachment of the gills; the nature of the stem inside and out; the presence or absence of ring, veil, and volva, and the nature of each; and also the color and sometimes the shape and size of the spores. No permanent character, whether gross or minute, must escape the eye.

A brief outline of Fries's classification of the Agarics will indicate how the most prominent of these characters are seized upon for a division into groups and genera. The Agarics proper, in which the hymenium is closely connected with the tissue which supports it, fall readily into five groups according to the color of their spores, which are white, pinkish or salmon-color, rusty-brown or ochraceous, dark or purplish brown, and black. Each of these groups is divided into genera (called subgenera by Fries, who placed all five groups under one genus, *Agaricus*) by differences in gross and minute structure. For example, among the white-spored genera (*Leucospori*) *Amanita* is known by its volva; *Lepiota* by its ring and free[1] gills, *Armillaria* by its ring and adnate[1] gills, *Tricholoma* by practical absence of veil and by sinuate[1] gills, *Clitocybe* by decurrent[1] gills, *Collybia* by the involute margin of the young pileus and by a cartilaginous stem, and so on through the list. With the pink spored Agarics (*Hyporhodii*) we run through the same category of structural differences, *Volvaria* corresponding to Amanita, *Entoloma* to Tricholoma, and so on; and the same thing may be said of the rusty brown spored (*Dermini*), the dark brown spored (*Pratelli*), and the black spored (*Coprinarii*), although in the last three groups by no means all types of structural difference are represented. To avoid possible confusion in nomenclature, it should be said that since the subgenera of Fries's original genus Agaricus have been raised to generic value, the old name *Agaricus* formerly given to each species has been retained only for the species of Fries's subgenus *Psalliota*. Hence what old-fashioned writers call *Agaricus muscarius*, *A. procerus*, *A. equestris*, *A. sinuatus*, etc., are now known, respectively, as *Amanita muscaria*, *Lepiota procera*, *Tricholoma equestre*, and *Entoloma sinuatum*.

Still other genera not included by Fries in the old genus Agaricus are included by Saccardo, and after him by Massee and others, with the genera already mentioned under four groups, divided according to spore color. Among these genera are *Cortinarius*, distinguished by its arachnoid veil; *Coprinus*, which deliquesces to an inky liquid; *Cantharellus*, with gills like swollen veins; *Lactarius*, with milky juice; *Lentinus*, with tough substance and serrate gills; and others.

[1] The significance of these and other terms was made clear by lantern slides.

In concluding I present to you the portrait of the revered Swedish mycologist, Elias Fries, who first introduced logical order into the systematic arrangement of mushrooms. After a life devoted to botany, and principally to mycology, he died in 1878 leaving all subsequent students of his chosen field everlastingly indebted to him. The portrait is taken from the second volume of his classical "Icones," or illustrations of mushrooms, which, together with his earlier work on the edible and poisonous species of Sweden, may be seen in the library of the Massachusetts Horticultural Society.

Hoping that this brief exposition in connection with the figures that you have seen may have cleared the ground a little, I refer you for more detailed information to the many good books upon the subject, and particularly to the mushrooms themselves.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 23, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

THE CHRYSANTHEMUM: ITS PAST, PRESENT, AND FUTURE.

By EDMUND M. WOOD, Natick, Mass.

I have the honor, and most assuredly the pleasure, of addressing you upon a subject dear to us all, if for no other reason than that it is a part and parcel of "the means by which we live." The Chrysanthemum has, not inaptly, been termed "the Queen of the Autumn," and it is certainly, as it well deserves to be, one of (if not altogether) the most popular of autumn flowers, a special reservation being made at all seasons for the incomparable and unexcelled Rose.

A famous Irish poet, William Allingham, thus sings:

> "The rustic family of ox-eyes claim
> A royal cousin clad in purple and gold,
> Pearl, ruby, fleecy colors, such as fold
> The couching sun, and with a lofty name
> Chrysanthemum, — appearing bright and bold
> To startle poor November with a flame

Of sumptuous flowerage, making Summer tame,
And flush with Eastern pomp the dark and cold.
Voyager from Japan and broad Cathay,
The slant-eyed yellow people love thee much:
(All humans love a flower) and know the way
To fix their garden favorite with fine touch
In shapes of art. How joyful we to clutch
Their gifts! — but shall we clasp their hands one day?"

Mr. B. C. Ravenscroft, in his treatise on the Chrysanthemum, published in London in 1894, speaks of the popularity of the flower in England. He says that "from the date of the first Chrysanthemum show held in England in 1830, it has steadily advanced, not only in popularity, but in the size and beauty of the flowers as well, and above all in the number of new varieties constantly being introduced. As a matter of fact, more 'novelties' are now being raised and sent out annually than the entire list would number but a very few years ago. Several years have now elapsed since it was the opinion of many horticulturists (myself among the number) that the Chrysanthemum 'craze' was already on the wane; but the event proved the idea to be altogether erroneous. On the contrary, the flower has since become vastly more popular, and is now cultivated in much larger numbers and to greater perfection than ever." Our own experience here in the United States is but a counterpart of that in the mother country.

Mr. Ravenscroft says further, and very justly, that "the secret of the extraordinary popularity of the Chrysanthemum is probably to be found in its unprecedentedly accommodating character, combined with its great utility, not only for exhibition and ordinary decorative purposes, but for supplying flowers for cutting, etc.; while the fact of its natural season of flowering being the autumn and early winter, when flowers generally are much scarcer than at any other season, is doubtless a strong point in its favor. The culture of the plant, at least to a moderate degree of excellence, is also extremely simple, though this can scarcely be said of the production of blossoms for exhibition of the degree of perfection that is required at the present day; while the season for flowering is a long one, and may be extended to more than half of the year.

"The Chrysanthemum is indeed vigorous, free-rooting, and

floriferous to a quite unusual degree, and is, moreover, easily and rapidly propagated with the simplest appliances.

"Again, it is an almost, if not quite, hardy subject: and though a slight amount of artificial heat is at times necessary or desirable, yet it is quite possible to cultivate even the fine show varieties successfully up to a certain point without the aid of any heating apparatus whatever.

"In form, size, and color the flowers are also extremely varied, and for the most part artistic, lacking entirely the stiffness and formality of the Camellia and several other flowers; in size they vary from the tiny pompone, one inch across, to the huge Japanese blossom, one foot or more in diameter; while the range of coloring is also exceedingly large, and the hues for the most part are very rich and soft, if not exactly brilliant. Without doubt, the introduction, or rather development, of the large-flowered Japanese varieties, with their fantastic and endlessly varied forms, and rich, æsthetic coloring, has done much to popularize the plant. One has only to compare the general appearance of a stand of twelve or twenty-four of even the finest incurved varieties with an equal number of Japanese flowers, to appreciate the great superiority, from a decorative point of view, of the latter; while the plants themselves are, on the whole, of a decidedly more robust and vigorous constitution, and consequently more readily cultivated than the formerly more favored incurves."

One more advantage possessed by the Chrysanthemum is that, unlike the Rose, it evinces very little objection to a smoky atmosphere, and may be cultivated almost as successfully in the heart of a city or large town as in the purer air and under the clearer skies of a country spot. As a proof of this, I deem it only necessary to refer to the remarkable showing of Chrysanthemums found in the Temple Gardens, in the very midst of the smoke and the black fog of London. But to produce this result, intelligence and a thorough knowledge of the gardener's art are a prime necessity.

"As cut flowers Chrysanthemums are unsurpassed, if equalled. The colors are admirably suited for all decorative purposes, while the blossoms not only pack and travel better than those of most other subjects, but they also retain their freshness for a long time when placed in water, often, in a cool and dry atmosphere, for some weeks."

The Chrysanthemum, by which is meant our present race of autumn-flowering hybrids, is descended from two original species only, namely: *C. Indicum* and *C. Sinense*. It is in reality a half-hardy undershrub, for the stems, which towards the end of a single season's growth assume a woody nature, if not exposed to more than a few degrees of frost, retain their vitality, to some extent at least, and, under such conditions, frequently break into fresh growth some distance above the base. But in an inhospitable climate like ours, the stems would be invariably killed back to the ground each winter, and thus become annual merely, while the plant itself assumes the character of a herbaceous perennial. The roots, especially those of the finer, large flowering or "show" kinds, if left in the open ground, would be killed outright during a severe winter, and the more effectually should the soil be damp, heavy, or cold.

Here let me say that a Chrysanthemum with small yellow flowers grew in the Apothecaries' Botanic Garden at Chelsea, in England, in 1764; but the first of the large-flowered varieties was received at the Royal Gardens at Kew, and blossomed in 1764, and it is from this latter that the centennial introduction of the flower into England dates.

The first English seedlings of the Chrysanthemum were raised in 1835; and the first Chrysanthemum exhibition in England was held in 1843 at Norwich, and this was soon followed by the Society at Stoke Newington, now known as the National Chrysanthemum Society.

A new era in the history of this plant opened in England in 1847, by the introduction of the Pompon. In 1843, at the close of the war with China, Mr. Robert Fortune was sent out to that country by the London Horticultural Society to collect rare plants, and one of the curiosities he fell in with was the Chusan Daisy; and this and another small flower from the same source were the parents of the tribe known, from their resemblance to a rosette, as Pompons.

Still later, in 1860–62, Mr. Fortune made more discoveries at the town of Ak-sax-saw in Japan. He describes this town of Ak-sax-saw as the most famous place near Yeddo for the variety and beauty of the Chrysanthemums, some of which were in form and coloring quite distinct from any then known in Europe. "If," he said, "I can succeed in introducing these varieties into

Europe, they may create as great a change among Chrysanthemums as my Chusan Daisy did when she became the parent of the present race of Pompons." They were taken up in England, proved successful, and from them sprang those marvellous flowers which it is the pride of all you gentlemen to present yearly at the notable exhibition of our Massachusetts Horticultural Society.

And speaking of our own exhibition, I am reminded of the fact that in Japan every year a special imperial garden party is given in the palace grounds at Yeddo, in honor of this national flower of Japan; and at this, which may be termed the leading show of the world, some of the plants display not less than from three hundred and seventy-five to four hundred and fifty fully developed blossoms, growing upon a single specimen at a time.

The Chrysanthemum has been known in the United States for quite a number of years, but as to its early history here not much is to be gleaned, while as to its career in other countries we are left completely in the dark, with the exception of France. Mr. Dale, for some time the gardener to the honorable Society of the Middle Temple, in London, says of the Chrysanthemum, that "in the early part of the present century it was one of the most popular flowers of England, and, further, that after a period of comparative neglect it has again been admitted to a place in the list of the florists' flowers" — a circumstance in which I am quite sure that all of us rejoice. Indeed, Mr. Dale was so much impressed with the beauty of these extraordinary flowers that he tells us that from the necessity of his having to produce a display of flowers during the greater part of the month of November, his attention was especially directed to the Chrysanthemum as the only one suitable to his purpose.

The Chrysanthemum derives its name from two Greek words, *chrysos* (gold) and *anthos* (flower), and belongs to the natural order Compositæ, and in the Linnæan classification of plants we find it in the class *Syngenesia* and order *Polygamia Superflua*. Its flowers consist of four varieties, namely, Incurved, Reflexed, Japanese, and Anemone flowered. Incurved flowers approach the nearest to what florists consider as the true standard of perfection. Reflexed flowers, though not so good, are by no means to be held in disdain. The Japanese vary very much both in color and the conformation of the flowers, and are most invaluable for conser-

vatory decoration, remaining longer in bloom, and extending oft-times to "January's front severe."

Among Chrysanthemums the Japanese class stands foremost because of its great size, richness of coloring, and the general effectiveness of its flowers; and it is beyond all question the most popular and useful of all classes. The flowers vary greatly in form, and, with perhaps some few exceptions, the plants are of vigorous growth, with broad foliage, stout stems, and large flowers; and it may be that they are more easily grown than any of the other classes.

The Incurved class produces flowers whose petals are bent inward toward the points, presenting the appearance of a more or less perfect ball or sphere. It was the first distinct class obtained, and although it is very beautiful, the blossoms in the mass are not so thoroughly effective as the Japanese, lacking, as they do, the richness and great variety of the coloring. They are, also, more delicate, and certainly more troublesome to manage, than are the Japanese.

In the Reflexed class the flowers are not as large and showy as in some others, yet they are beautifully formed. The petals are reflexed or curved downwards, and overlap each other with the greatest regularity, and the coloring is very soft, delicate, and rich. The whole class are excellent growers, the plants bushy and branching, and they are most prolific in blossoms. They are splendidly adapted to open-air culture.

Of most of the Pompon class, as you all well know, the flowers in general are insignificant in size, although some, which are known as "Hybrid Pompons," are comparatively large.

The early, or what may be known as the summer-flowering, Chrysanthemums form a somewhat varied, but none the less a most useful class. The blossoms of several of the earliest flowering group are no larger than those of the smallest Pompons, while their growth is but very little more than a foot in height. From these the flowers range in size up to those of Madame Desgrange, William Holmes, etc., which are only slightly smaller than some of the Japanese flowers, and the plants increase up to three feet or four feet in height. As a result of hybridization between the two classes the early-flowering kinds run quite imperceptibly into the Japanese, the connecting links being found in such varieties as Madame Desgrange and its sports; Mlle.

Lacroix, Lady Selborne, P. van Geert, etc. The first named, with its sports, G. Wermiz (primrose) and Mrs. Hawkins (deep gold), form a beautiful and most useful group, admirably adapted alike for indoor decoration and for culture in the open air; and a great future is in store for this most excellent and attractive group.

Having thus briefly, and much to my regret imperfectly, sketched the history and peculiarities of this most charming flower, let us take a glance at the methods of its cultivation.

Mr. Edwin Molyneux, gardener to W. H. Myers, Esq., of Swanmore Park, Bishop's Waltham, England, may be looked upon as an expert in all that appertains to the Chrysanthemum, and he "regards a favorable start as being necessary to a successful finish. The foundation must be thoroughly laid to insure that success which all should strive to attain who engage in the cultivation of this flower." Mr. Molyneux speaks *ex cathedra*, for during a period of six years he won eighty-six prizes, and of these no less than seventy-four were firsts. Moreover, these prizes were won in competition with the best growers of the day at the leading shows in the south of England; and the Swanmore blooms were placed first during four consecutive years in the great cup class at Kingston-on-Thames — a feat unparalleled in the annals of Chrysanthemum showing, and never approached since. Mr. Molyneux deserved to be crowned King of Chrysanthemum growers and exhibitors.

And here allow me to suggest a fact with which no doubt you are all quite familiar, that within a radius of ninety miles of Boston the Chrysanthemum is grown to a perfection nowhere excelled in this or any other country.

The cultivation of the Chrysanthemum for blooms for the market and single specimens for exhibition is attended with much more care and labor than any other branch of the Chrysanthemum raising industry; and the fact remains that the culture of the flower, for exhibition alone, has now been elevated to the dignity of a fine art, or rather to that of an almost exact science, and those who desire to win in the future must do not only all that men who have made the subject a special study of a large part of a lifetime have done in the past, and can do at the present time, but a little more than that, and, if among the possibilities, much better, also.

Growing for exhibitions is a most arduous task — the most

arduous, perhaps, that falls to the lot of the Chrysanthemum raiser, with the single exception of raising new varieties from seed. Exhibiting at the present day is by no means what it has been in the past, and the gaining of prizes has become a really difficult feat. Judging is more minute and more intelligent than it was in bygone days. It is now performed almost exclusively by points, and in order that a sufficient number of these points may be secured, untold minutiæ must be most closely observed, otherwise the cultivator, to use a homely, but yet most applicable phrase, "will not be in it." The only way to succeed in these days is to acquaint one's self thoroughly with the details of cultivation as practised by the best growers, and then by some fortuitous combination of circumstances to discover a way by which a better method, no matter how slight, may be attained. In all cases, however, constant and unremitting attention must be bestowed upon the plants from the time the cuttings have been first inserted, until the flowers have been placed upon exhibition and the prize won.

There is one fact that it is well to bear constantly in mind, and that is, that it is absolutely useless to attempt to grow plants or blooms for exhibition, unless they have your constant attention. To give them an occasional attendance, or even but once a day, is in itself a suicidal act. As eternal vigilance is the price of liberty, so unremitting attention is the price of success, so far as the Chrysanthemum is concerned. It is a plant that possesses a most voracious appetite, and it requires to be fed with as much regularity, and as much care, as a suckling infant. It is dainty in its food, and it is a gourmand as well as a gourmet. It requires plenty to eat and drink, and of the very best the market affords. It must be fed upon the very best soils, manures, etc., and its drink must not be alone "the crystal well," but rich liquids and plenty of them, and withal, like the human system, it must breathe a sufficient supply of fresh, wholesome, and life-giving air. Proper drainage is an essential requisite, in order to insure that the plants, as is sometimes said of an unfortunate ship, shall not become "water-logged." Cleanliness is next to godliness in the plant, as well as in the man, and therefore the intelligent grower will see to it that his plants have a clean habitation. Never use a dirty pot. The pots, or the long boxes in which the plants may be raised, should be perfectly clean. Now

this, on the surface, appears to be a trivial matter, but in reality much depends upon it. Test it, and you will find that in turning plants out of pots that were dirty when used, the roots cling so tenaciously to the sides that many are broken in the act of removing them. This does not occur if the pots are clean, but the plants may be shifted with their roots intact, and will not undergo the slightest check from the operation.

In the cultivation of the Chrysanthemum do not attempt too many varieties:

> "The friends thou hast, and their adoption tried,
> Grapple them to thy soul with hooks of steel;
> But do not dull thy palm with entertainment
> Of each new-hatch'd, unfledg'd comrade."

An eminent English authority said on this matter of novelties, "I venture to say that quite three parts of the new sorts sent out in such glowing terms are not equal in merit to many of the older varieties. No little disappointment has been caused by purchasing all the new varieties, which were expected to produce wonderful flowers. Instead of this it has often been found that time and space have not been well occupied in growing them. Far better is it to grow an extra number of plants of those varieties which experience has proved can be depended upon as certain producers of first-class flowers under first-class culture, than for a grower with limited experience, money, and space to overburden himself with so-called 'novelties.'"

Every grower of the Chrysanthemum is well aware that it has a tendency to "sport;" that is, a plant that has always yielded flowers of a certain color produces others of a different hue — yellow, for instance, giving out bronze or orange. There are instances when the whole of a plant will thus throw different colored blossoms, but as a rule they are only to be found on one branch. Many of these "sports" when "fixed" are improvements upon older kinds. Cuttings taken from the branch or part of the plant which "sports" will usually produce flowers of the same color again. If they and the plants raised in turn from them continue to do so, and the departure becomes a permanency, the sport is said to be "fixed;" and if this fresh break is of a new or desirable hue and character, or in any manner an improvement upon existing forms, it receives a name, is propagated, and introduced into the market. There are occasions, however, when

a sport will sooner or later revert to the original color, and, as a matter of course, it becomes worthless.

There is no earthly reason why a new variety obtained from a sport is not, to the full, as good as one obtained from seed. Many forms of the incurved class have been procured in this manner. It may be said that the general system of growing Chrysanthemums for the sole production of large blooms is not favorable for increasing the number of new varieties by sports, on the ground that the plants are denuded of the side shoots as they grow, and it is from these very side shoots, when they are permitted to develop themselves into flowers, that the largest number of sports are obtained. In the Japanese class the fewest sports are found. With scarcely an exception all sports are the counterparts, in foliage and habit, of their parents; and there cannot be the least doubt that some of them possess better constitutions and produce finer flowers than their originals, or that they are, in some respects, improvements upon their parents.

The Seedling Chrysanthemum is not "like angels' visits, few and far between," but on the contrary, it is the rule and not the exception. Save a comparatively small number of sports, all the varieties of the Chrysanthemum that are in cultivation have been raised from seed at one period or another; and it is of course only in this manner that really new and distinct kinds are to be obtained. It is regarded as a curious fact that in England, where the growing of the flower is second only to that of China and Japan, for many years past, and until quite recently, few, if indeed any, attempts have been made to raise new seedling plants, although in the early days of its cultivation a number of what were then considered remarkably fine varieties were obtained from seed. Owing to the damp and unfavorable conditions of the English autumns, so much difficulty was experienced in ripening the seeds that the attempt was relinquished, and nearly all the novelties displayed in that country were obtained from raisers in Japan and France, with a few from the islands of Jersey and Guernsey; and the confession is made that in recent years, we Americans have taken up the industry with such great zeal and energy that we have supplied to the mother-country several hundred of more or less fine and valuable introductions with stronger constitutions, thus enabling seed of the Chrysanthemum to be again grown in England.

Within the last three or four years fresh attempts have been made in this direction in England, and they have not only resulted in some really surprising successes, but they have demonstrated the fact that in the damp, smoky, and humid climate of England, well ripened seed can be produced with considerable certainty from American varieties, and that such seed, if saved with care, will afford a large proportion of varieties fully the equals, and in many respects the superiors, to the bulk of those imported from other countries.

In the raising of plants beware of their enemies. That they have enemies is beyond all question. Chief of these are dampness and pestiferous insects. The first is easily overcome by the simple application of moderate heat constantly passing over and around the plants; but the second is not so readily vanquished, especially if permitted to become numerous upon the plants. Then it is that

> "Diseases desperate grown,
> By desperate appliance are relieved, or not at all."

The one great disease to which the Chrysanthemum is liable is mildew. It appears in the form of a white, woolly-looking growth, mostly on the under sides of the leaves. In its nature it is a fungus, and in a close atmosphere it spreads rapidly, and sadly impairs the functions of the foliage. The simplest and it may be the best remedy is sulphur, and if this is applied in time it will generally check, if not immediately cure, an attack.

One of the best qualities which this flower possesses is the long time the blooms remain fresh, either growing on the plants or in a cut state; still, greatly to the disappointment of many growers for exhibition, they ofttimes fail to keep long enough; and thus a large number of fine blooms are rendered useless through the too early development of some of the varieties. As to the cut blooms intended for exhibition, there is in reality no royal road to success with regard to their perfect preservation for a greater or less period. Much of this success will depend on good luck and the state in which the blooms were when cut from the plants; and if they should remain in such complete condition as to gain you the prize at the exhibition, thank the blind goddess Fortune therefor.

It is an undisputed fact that there is much misunderstanding

among growers of the Chrysanthemum, as to what qualities do in reality constitute a good bloom. Size is the first object a cultivator has in view, but this in itself is not enough, and must be accompanied by other good points before the flower can take rank as a first-class specimen. These several points or qualities may be set down as size, depth, solidity, breadth of petals, form, finish of flower and foliage, freshness, and most certainly color. I do not know as there is any absolute size to which the various classes of the Chrysanthemum may be grown at the present day, or to what perfection it may attain in the future; but this I feel well assured of — given the qualifications of depth, solidity, breadth of petal, form, finish, freshness, and color, then the larger the size to which you can bring it, the greater the prospect of carrying off the much coveted prize.

Here permit me to say that the rage for this unquestioned and unquestionably charming flower being still on the increase and its capabilities to all appearances being inexhaustible, a most inviting and remunerative field is opened up for the energies of all those who have the means, time, and patience to embark in its culture.

The folklore of the Chrysanthemum is very limited, and is confined to China and Japan. In the former country there is a proverbial rhyme connected with it, which may be translated as follows:

> "In the second month the Peach tree blooms,
> But not until the ninth the Chrysanthemums;
> So each must wait till his own time comes,"

which, as I take it, is a somewhat refined way of saying "every dog has his day," and so the charming English poet, Henry Kirk White, sings:

> "Say, what retards, amid the summer's blaze,
> The autumnal flower, till pale declining days?
> The God of Seasons, whose pervading power
> Controls the sun, or sheds the fleecy shower;
> He bids each flower His quickening word obey,
> Or to each lingering bloom enjoins delay."

The Japanese have a fancy that the dewy juices in the heart of the Chrysanthemum are the "Elixir of Life."

The poets, in a great measure, have paid little if any attention

to the Chrysanthemum, but appear to have expended nearly all their genius on the well-deserving rose, and other flowers.

Here is a translation of a poem, by Satoni Sensei, a native Japanese:

"O bloom of Chrysanthemum,
Fabled of old,
A fountain of rapture
And sweetness untold —
The dewy wine sparkled
With life in its flame,
And mortals partaking
Immortal became.
But lo! There hath opened
A wonderful flower,
For God's love hath blossomed —
Soul life in its dower,
And its petals shall shine
More endearing than thine,
With their fabulous treasures of life-giving wine, —
Far fairyland's store, —
And its dewdrops shall glow,
And its fragrance shall grow
From more unto more
While the years come and go."

We are indebted to Dr. Walcott, of Cambridge, and Mr. W. K. Harris, of Philadelphia, who were pioneers in fertilization of the flowers in this country, for varieties which they have produced. They were instrumental in creating a wide interest in the flowers. Later Mr. Thomas H. Spaulding, of New Jersey, and Mr. E. G. Hill, of Richmond, Indiana, took up the cultivation.

There is one thing to which I wish to call the special attention of your Society, that it may, I trust, be abandoned: it is the unsightly staking of Chrysanthemum plants with willow and other stakes, reminding one of a cripple supported on crutches. They have neither grace, finish, nor even presentable foliage, or flowers with either form or coloring. If judged by a correct standard of coloring and finish or foliage, all would be condemned, and relegated to the rear. While the late exhibit showed wonderful specimens of single flowers, the plant exhibit was anything but creditable as compared with the cut blooms. I trust that the coming season plants will be judged by a standard of blooms, by finish and luxuriance of foliage, by the form and color of bloom,

and that the plant shall exhibit only its flowers and foliage, and not a forest of unsightly sticks supporting a weak stem with little or no foliage, and colorless flowers.

I agree with the writer who said the nomenclature of the Chrysanthemum has not been much improved. Nearly all the names are of private persons, which, of course, to the great mass of people are as arbitrary and meaningless as "S.T.1860X," or any other cabalistic combination, and yet there is always the possibility in the case of every variety of Chrysanthemum of a perfectly happy and descriptive name. Here is a certain Chrysanthemum, for instance, with a great many riotous, rollicking red flowers growing upon it, scattering themselves about in a perfectly drunken way. There is one name that suggests itself instantly in connection with this flower: it ought to be called the Tam o' Shanter. Every bloom suggests the intoxicated Scotchman looking back in terror at the pursuing fiends. But what is the flower named? J. Collins. Tom Collins would have been better.

The first Chrysanthemum exhibit for prizes in this country was made at the Massachusetts Horticultural Society's Exhibition in 1861, and the prizes amounted to $17. In 1868 the exhibition was first styled the Chrysanthemum Show, and the prizes were increased to $55; this exhibition was an entire failure. Up to 1868 these shows were on Saturdays, from 12 to 3 P.M., but in 1879 it was held on Wednesday, from 12 M. to 10 P.M. In 1882 the prizes amounted to $121. Though planned for one day, it was kept open two days on account of the excellence of the exhibit and the interest taken therein. It continued in this manner each year until 1886. The prizes were increased, and in 1887 amounted to $741, and in 1896 to $1,200, the exhibit lasting nearly the entire week.

It will be observed that interest in the Chrysanthemum has steadily increased year after year until the last season, when the Exhibition of the Massachusetts Horticultural Society exceeded all previous ones in beauty, size, finish, and coloring of the flowers — and even surpassed the expectation of the most ardent admirer of the beautiful Queen of Autumn, excelling all exhibits in the United States, and, it is believed, not outdone in any part of the world. In the attainment of this grand result, the Massachusetts Horticultural Society can justly take a large share of credit, with its encouraging, generous spirit toward exhibitors, entries being

free to all. Boston may well feel a just pride in the efforts of the growers who have made it possible to give to us such a regal show as they did the past season.

To the public a debt of gratitude is also due. Nowhere in the world do the people pay, and willingly, so high a price for a fine Chrysanthemum as the residents of the great and good old city of Boston. It is these elements that contribute to bring about such grand results, which would be impossible but for them.

In drawing to a close, permit me to say that I regard the future of the Chrysanthemum as assured. The advances made in its improvement have added greatly to the grace and beauty of the flower, and popularized it until it has won a permanent abiding place in all hearts. It will, indeed, be a bold flower which will be able to displace it, or even disturb its queenly hold upon us. The public, in time to come, will undoubtedly require, for the embellishment of the home, flowers of a smaller type, but of equal finish and color with the larger and more regal varieties, yet both will hold their proper place, and will equally delight and gratify our taste for this most attractive flower.

At the present time we stand simply on the threshold of its future, great as its advance has been in the past decade only. We have a right to anticipate those improvements which technical schools of chemistry, electricity, and kindred science are sure to bring. There should be no hesitancy in pressing on. The goal of ultimate success is already in view, and when that is reached there can be no further doubt of the established value of the Chrysanthemum in a mercantile sense, while æsthetically in bringing it to its highest pitch of perfection and beauty you will have succeeded in making it a joy forever.

Discussion.

Kenneth Finlayson asked, How can we bring specimens here without staking?

Mr. Wood answered, By almost any method but that used heretofore; they can be trained to wire supports.

Mr. Finlayson still thought that they could not be brought here without staking.

Mr. Wood thought that wire frames would be effectual, but he had not looked into the subject.

Thomas Harrison spoke of training the plants in a pyramidal form.

In regard to the application of sulphur, Mr. Wood spoke of using it, sometimes directly and sometimes on steam-pipes.

Mr. Finlayson inquired of Mr. Wood whether he used any particular fertilizer. The answer was that he had not tested all, but uses sheep compost, compost from horned cattle, sulphate of ammonia, and nitrate of soda.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 30, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following is an abstract of the lecture given:

PLANT BEAUTY.

By HENRY T. BAILEY, Massachusetts State Supervisor of Drawing, Scituate.

There are different kinds of love for flowers. There is the scientific love; those who have only this seldom get the true message of the flowers. At the other extreme are people having a sentimental love for flowers; they pronounce their colors marvellous, and gush indiscriminately over their beauty. The third kind of love for flowers has a basis of intelligent appreciation. The greatest enjoyment is when scientific love is combined with a sympathetic appreciation of beauty.

Plant beauty is of two sorts, beauty of color and beauty of form. In some plants, like the calla, beauty of form predominates; in others, like the pæony, beauty of color; in still others, like the gladiolus, the lines of stalk, flower, and bud are as noticeably lovely as their colors. In the rose we have beauty both of form and color. Plants conspicuously beautiful for their form should not be gathered together in tight bouquets; each should be enjoyed by itself or with two or three companions so grouped in a vase or other receptacle that the beauty of the lines of each is enhanced by that of the others. Plants of lovely color, on the other hand, are more effective when massed. One snowball is insignificant; a bushel basket full of branches crowded

with the balls of creamy white glowing against the rich green of their foliage is highly effective. In the arrangement of flowers of beautiful form, we have much to learn from the Japanese.

The "Studio" for October and December, 1896, has suggestive articles, with more suggestive illustrations, of the fine art of flower arrangement as practised by the floral artists of the Sunrise Kingdom. Mr. Conder's book, "The Flowers of Japan and the Art of Floral Arrangement," to be found in the Library of this Society, will repay thoughtful study. Even the suggestions from Japanese prints, now so easily obtainable, are not to be despised by the wide-awake florist.

The chief element in beauty of form is curvature. Ruskin says there are two kinds of curves, the mortal and the immortal. We love immortal curves — the simple curve of force, the reversed curve of grace, and the spiral. The curve of force is shown in the sky-rocket. Water shot out of a fountain takes the same curve; so also does the stem of the golden-rod. Reversed curves and spirals are seen in the unfolding of a fern frond. [These were further illustrated by charts and blackboard sketches.]

Another element of beauty is radiation; either from a centre, as in a snowflake, or from some point outside the centre, as in a palm-leaf fan. The effect may be bi-symmetrical, as in a scallop shell, or balanced, as in a begonia leaf.

Our fathers preferred the bi-symmetrical arrangement. It appeared in the little tight headed bouquets brought to church, and in all manner of decoration. It was even supposed that houses must be bi-symmetrical — that is, that the two sides must not only balance each other, but must be uniform in shape; and inside the same bi-symmetrical arrangement was thought necessary, even to the placing of photographs and vases on the mantel.

The arrangement evidently preferred by nature is that of balance. This is illustrated by a leaf where the portion on one side of the mid-rib is smaller than the other, and perfect balance is secured by the curvature of the mid-rib and stem to the needy side. The Arethusa poised on its stem is another fine illustration. Balance may be seen illustrated in the lines of the hand. It controls the position of the leaflets of the rose and sumach. The Maine woodsmen know that trees are so balanced that if but an inch of wood is left under the centre the tree will stand. A stem of grass shows the balance of parts which make it self-sup-

porting. The grouping of plants or sprays is to be governed by the law of balance.

Beautiful color has such qualities as purity, gradation, and depth, and when colored flowers are massed, harmonious relations of the different hues should be secured.

All color comes from the sun. The standard colors are red, orange, yellow, green, blue, and violet. The first quality in color is purity. Color must not be muddy, as is often seen in novel varieties of pansies.

There are five typical color groups or harmonies. The first may be called a contrasted harmony. All green-leaved plants with white flowers are in this group. The second is dominant harmony, produced by combining tints and shades of one color, as, for example, a head of hyacinths or a bunch of double violet asters with no green foliage in sight. This combination of tints and shades, so common in the decorative arts and in dress goods, is rarely found in nature, and is least satisfactory as a harmony. The third is analogous harmony, composed of related hues of color. All green-leaved plants with yellow flowers are in this group. A bunch of gladioli tinted with violet-red, crimson, rose, scarlet, and salmon forms an analogous harmony of exquisite beauty. The fourth is complementary harmony — a harmony brought about by the juxtaposition of complementary colors. A violet red camellia seen against its glossy green leaves is a complementary harmony; so, also, is a bunch of violets with their yellow-green leaves. Another beautiful example is the marsh St. John's-wort, the leaves of which are green-blue, with a thick bloom, while the flowers are an orange tint, thus giving two complementary colors. The rocks at the seashore are in the orange scale, and the water being in effect a green-blue we have complementary harmony. Inland the rocks are covered with lichens of gray color, to contrast with the grass. The crags of the Alps are orange, from the orange-colored lichens growing there, making a tone complementary to the color of the sky. Such facts seem to prove that the Almighty who made these colors loves harmony. "He hath made everything beautiful in its time."

The fifth is perfected harmony: a color group composed of analogous hues combined with a color complementary to the general effect of all the group. For example, the gladioli form-

ing an analogous harmony if placed against a background of old ampelopsis leaves, of rich, bluish-green color, would be greatly enhanced in color effect, and the whole would form a perfected harmony. A bowl full of pansies is in perfected harmony. The analogous group runs through varying hues, from pure yellow in the flower centres to the yellowish-green of the foliage. The complementary to the effect of this group is to be seen in the rich purple of the petals. [Charts, diagrams, and bouquets of flowers were used to make this clear. The complementary and analogous colors were illustrated by means of the Bradley color wheel.]

The American people are becoming more sensitive to beauty every year. The florists who furnish flowers to decorate their homes and halls can do much to elevate public taste. A really beautiful thing is always attractive. What was true for Emerson is true for us all. Speaking of beauty he said:

> "When first my eyes saw thee
> I found me thy thrall."

It costs no more to make a beautiful bouquet than to make an ugly one, and ultimately he who produces beauty gives the greater pleasure and receives the larger reward.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 13, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

THE SWEET PEA, THE FLOWER FOR EVERYBODY.

By Rev. W. T. HUTCHINS, Indian Orchard, Mass.

It is simply impossible that either the commercial or the popular interest in floriculture should decrease. In such a country as ours it must not only increase, but for some time to come the very ratio of this cumulative growth of interest must increase. The demand for florists' stock, the seed patronage, the organization of floral societies, and the popularizing of exhibitions, — we see all these increasing with phenomenal rapidity. Indeed, more

remarkable than all these is the wonderful progress made in the past ten years in evolving improved forms and multiplied varieties in many of our garden favorites. Our country is still in but the infancy of its floral development.

It is easy of course to glut the market and make it appear that the florist's and the seedman's business is overdone. But a whole continent of educational work is before us, in which men, women, and children are to awake to the floral needs and joys of their nature. We have not begun to put the art of floriculture where it belongs — in the very van of the finest arts. The arts of painting, drawing, and sculpture long ago attained the dignity of having schools, and masters, and pupils without number, and a splendid patronage. The musical arts are on a basis of careful training, and our admission to civilized society almost depends on our either being musicians of some sort or having an educated appreciation of music. These things have asserted their right to the name of "art," and to universal recognition. But floriculture is in its undeveloped stage. It is still little more than a voice in our nature crying for attention. It has won as yet from people generally only enough response to prove that it is destined to become an art of arts for our universal pleasure and profit. The "fine arts" are indoor arts, and since one-half our life is spent indoors the refinement of society has been shaped accordingly into the arts of the parlor and the drawing-room. But our Creator turns us outdoors for the other half of the year, and here in this country we are only learning how to use our summer leisure, and in what direction to look for outdoor pleasure. Our American life is being redeemed from a state of grinding toil. We have largely passed the pioneer stage of hard grubbing for a living. As fast as we get above the level of a precarious livelihood we have time coming back on our hands, or at least can afford to take time for healthful and enjoyable diversion. Home may mean a bed, a table, and a roof, at first, but as surely as we prosper home comes to mean things beautiful within and without. A well-kept lawn and blooming garden are inevitably in the line of our mental and social development, and we get them at about the same time that we have means, leisure, and appetite to devote to these things.

Some very interesting conclusions in this direction might be drawn from the multitude of letters I receive from men of all

professions. The time has gone by when floriculture was an effeminate diversion. Of course when virile men are busy opening a continent to commerce, and wrestling with the stern pioneer facts that dispute every inch of a man's progress towards success in any business, they are not thinking about posy beds; but as surely as a refined and intelligent man gets beyond the critical stage of his business or professional development, the tastes of his mind will come to the surface and he will yield to the sweet seduction of such diversions as have restful pleasure in them; and, speaking for this mundane world, the very man who is running under the highest pressure of business is the man who must yield to the enticement of some pleasant hobby or speedily terminate his suicidal career. I do a good deal of floral preaching outside the pupit, for I consider that there is no higher humanitarian mission than to persuade men to wed some hobby that shall make them absolutely forget their daily vocation for an hour or for a half-day. I will challenge any man to find an avocation that will more restfully exercise and at the same time divert body, mind, and spirit than some special line of floriculture.

A short time ago floriculture was what it was to your dear old grandmother, a medley of confused flowers. But a new era in floriculture has dawned. Life is now too short to master even one flower as we have come to understand it. A man deserves to be knighted who takes some sweet floral nymph of the woods, or some old-fashioned favorite of our childhood garden, and makes a royal family of it, unlocking the mysterious colors that are hidden in its pale bosom, and turning one modest little Cinderella into a hundred queens of beauty and proud grace. What Mr. Eckford has done for the Sweet Pea, a score of other consecrated noblemen have done for other flowers. The time has not come to canonize these men. They have come through the humble walk of being some rich man's gardener, or they are down on their knees in communion with the soil, wearing the poor man's clothes, earning the pittance of a struggling florist, happy if some lady will pay the cheap price of a nosegay! But if you will believe it they are ushering in the day when floriculture will be the queen of arts, and when men of the proudest ambition and intelligence will aspire to have their names associated in monumental remembrance with the development of some flower. We

have carried nothing to perfection yet. One by one the flowers that have great possibilities in them make their advent into this new era. They have only made their graceful bow to us. You have only begun to know a flower when you see it as it is. You must have the prophetic anointing and see it as it is to be.

I felt deeply touched as I went into the dwarf canna house at the Royal Horticultural trial gardens with Mr. Eckford and heard him, as he stood before the flaming cannas, say he would like to begin life over again and devote himself to them. It was the soul of this old florist, who is through his work, that looked into the future of the dwarf canna and saw the vision of its coming glory. To see a flower with the heavenly eye, and love it with the heavenly heart, is to drink in its full prophecy, and it is that which consecrates the florist and lifts his business above the slime of commerce to the ethereal purity and pleasure that God has hidden in his beautiful handiwork.

I know we are living in the football era, and men gravitate towards half-civilized and even brutal athletics, and call it pleasure; but floriculture is at the other end of man's development, and is both beautiful and manly.

I have tried to study one flower, but not a day passes when I do not blush because people write to me as if I knew something about that flower. I know enough now to know that I know almost nothing about it. I am in love with it — wedded to it — learning about it. I have put ten years of hard work on it, but it is too deep for me. I wonder if your roses and your carnations impress you that way. I am sure you have a man's work before you, to master the rose and the carnation. How wonderfully their increasing beauty rewards you, and yet keeps you humble. It is a grand thing to be occupied with something that rewards you with pure pleasure and at the same time gives you a humble estimate of yourself. That is the divine mission of floriculture. Take any flower you please — there is room enough for mental and spiritual expansion in any one, and your pride will have as many falls as there are days in the year. Pardon this ministerial digression.

Now let us take a little history of the Sweet Pea. So far as I can learn, François Cupani, an Italian botanist in Sicily, about 1700, was the first cultivator of this flower. There appear to have been four original varieties, two of them natives of Ceylon

and two of Sicily. Linnæus makes these four native sorts pretty plain. It is possible that there were but the two of which De Candolle speaks, the *purpureus* and the *roseus*, and that the other two are variations of these.

The *purpureus* must have been very nearly like our common light blue and purple of the trade, for this is perhaps the commonest "rogue" to which the new sorts revert. It comes into the growers' fields everywhere. Then the original of the old Painted Lady, the pretty pink and white that everybody loves, must have been the native Ceylon variety called *roseus*. But there was an original red sort, and it appears to have come from Sicily with the purple. The *roseus* from Ceylon seems to have varied from pink and white to white. Going back thirty years from today to the beginning of the work on the modern Sweet Pea, we find these four originals, which probably show but little change from 1700 to 1860. I suspect that these original sorts broke into red and purple striped a good while ago. Call them varieties, and as late, say, as 1860 there could only have been the original purple, red, pink and white, white and red striped, and purple striped. Indeed when you study the seed business you very quickly get from modern history into ancient, and even the length of one generation will take us into that dim past. But the last thirty years have been a revelation and an opening era.

The first note of improved work on the Sweet Pea that I have states that Brown of Sudbury, England, received a certificate on Invincible Scarlet in 1865. It was put out by Carter of London. Then in 1867 we find the first improvement on the original purple, being given the name Imperial Purple, and leading the way to the Black.

About this time it appears that Cattell, of Westerham, had worked on the red striped and put it out under the name of the Queen. The next step was the introduction of the Crown Princess of Prussia, the mother of light, flesh-pink Sweet Peas, by Haage & Schmidt, of Erfurt, about 1868. Later the Violet Queen, put out by Carter, and then the Butterfly, by Sutton, in 1878. Carter put out the names Invincible Black and Invincible Scarlet Striped about 1880. Soon followed Lilacina Splendens, now a doubtful variety, although we still have the name Splendid Lilac. I suspect this latter is what more commonly became the Captain Clarke. The next decided acquisition of color was

Adonis, put out by Carter about 1884. The name Dark Red is from Benary, of Erfurt, and was a development doubtless from the original red.

We come now to the history of the Sweet Pea of today. Henry Eckford, of Wem, Shropshire, England, started into the specializing of this flower about 1876, the earliest notice of his offering anything being 1882. Mr. Laxton, of Bedford, also started in this race. Exact dates are not easy to determine. Novelties are exhibited at the flower shows sometimes two or three years before their introduction to the trade. Bronze Prince was certificated to Mr. Eckford in 1882. Carmine Rose, put out by Hurst, was certificated in 1883. But Mr. Eckford has dropped out everything offered before 1885. His really creditable introductions began with this date to be offered in rapid succession. Names of his that he has ceased to list are Bronze Prince, Queen of the Isles (this is still listed by the trade, but not by Mr. Eckford), Miss Ethel (long since dropped), Mauve Queen (the name under which Countess of Radnor was first certificated).

A word here about Mr. Laxton's work, before speaking more particularly of Mr. Eckford's. Mr. Laxton's son told me that his father had made a large number of crosses in Sweet Pea work, but with little satisfaction. He introduced Invincible Carmine and Invincible Blue, but the Laxton varieties now of most decided merit, having some originality of color, are Etna and Madame Carnot, 1891, Carmen Sylva and Rising Sun, 1892, and Princess May, 1893.

And now for Mr. Eckford: "The Garden," of London, has just paid him the compliment of dedicating its fiftieth volume to him. Mr. Eckford is now seventy-four years old. I found him at his pleasant Wem home in apparent patriarchal vigor in the summer of 1895, but since then his health has been broken and his work is probably done. His son John Stainer Eckford will succeed to the business. "The Garden" recites the record of Mr. Eckford's service from 1839 to 1897 in the employ of various gentlemen of title and wealth. I will insert here this valuable record verbatim:

"Mr. Henry Eckford was born at Stonehouse, in the parish of Liberton, near Edinburgh, on May 17, 1823. In December, 1839, he was sent as an apprentice to the gardens of Lord Lovat, Beaufort Castle, Inverness, where he remained for three years. He

returned to Edinburgh and then went to New Liston, the seat of Mr. James Hogg. He subsequently was employed as foreman in the following gardens: Fingask Castle, Perthshire; Penicuick House, Midlothian; and Oxenford Castle. In the beginning of 1847 he arrived in London with a letter of introduction from Mr. McNab, of the Edinburgh Botanic Gardens, to Mr. Hugh Low, by whom he was sent as foreman in the gardens of Colonel Baker, of Salisbury, then under the management of Mr. Dodds, who will be remembered in connection with the improvement of the Dahlia and other florists' flowers. He remained here for two years, afterwards serving under Mr. Fleming in the gardens at Trentham, and going thence to Cane Wood, Highgate. In 1854 he was appointed head gardener to the Earl of Radnor at Coleshill, Berks, where during his stay of twenty years he raised many Dahlias, Pelargoniums, and Verbenas, which were for the most part sent out by the late Mr. Keynes, of Salisbury. In the year 1878, Dr. Sankey, who was an enthusiastic florist, invited Mr. Eckford to take charge of his gardens at Sandywell, Gloucester, with the view to raising seedlings of florists' flowers. At this time the improvement in Sweet Peas had not been thought of, and in 1879 he obtained the best varieties of edible Peas and various Sweet Peas. He soon set to work and raised many fine varieties of edible Peas which are a gain in our kitchen gardens at the present day.

"To him is due the great improvement that has been made in the Sweet Peas, these more particularly having had his special attention of late years, and visitors to the Royal Horticultural Society's meetings will remember the fine collections he has on many occasions exhibited there. The Sweet Pea is the most valuable of all annual flowers of the present day; its delicious perfume, its diversity of lovely colors, its lengthened succession of bloom, and its value for cutting entitle it to a place in every garden. It may be had in bloom for seven months in the year from one sowing if care be taken to pick off every flower as soon as it shows sign of fading, not letting any seed-pods form. In order to obtain the best results from Sweet Peas, Mr. Eckford sows very thinly, with the result that each plant branches out and forms quite a bush. If gardeners would only sow their Sweet Peas, and edible Peas as well, thinly in good soil, they

would be astonished at the results. By thin sowing we get fine flowers and in abundance.

"The work of Mr. Eckford with the Sweet Pea shows how much may be done with simple and often neglected things in our gardens. The Sweet Pea certainly was always one of the most valued of flowers, but now, with so many delicate and lovely hues, Sweet Peas are a garden of beauty. Who knows how many other things in our gardens may not have in them the germs of like improvement? Even some of the shrubs that now have only one aspect for us may some day show us a like variety. In any case we owe many charming things for our open-air gardens to Mr. Eckford, and wish him many happy years more of his charming and useful work."

You would easily take Mr. Eckford for a retired professional gentleman, his face and figure hardly betraying the years he has spent as a gardener, and in hand to hand contest with the soil. He has been a priest of nature, and has grown old gracefully by reason of the masterly profession of extorting from Nature her deeper secrets. Some of his best life's work has been on Primulas, Cinerarias, and Pansies, he having received as high as sixteen guineas an ounce for some seed. His trials of culinary Peas were a revelation to me. I shall never forget how one day he allowed two ladies to wander at will through the grounds, and one of them came exclaiming, "Oh, Mr. Eckford, Mrs. ——— found a pod with thirteen peas!" Mr. Eckford knew too well just where every specially fine pod was, and even to touch one in such a sacred place was more than his years of gracious courtesy could allow. It is a rare privilege to enter such a floral workshop, and the hedge about it is high, and the tall gates are well padlocked, and there is a sentinel near by. I was shown into Vilmorin's floral workshop just out of Paris, and the walls about it are like State's prison barriers. There are no jewels that can compare in value with tiny seeds, especially after twenty years of special work are locked up in such a seed. In 1893 one seed, by some inexplicable law, produced a dwarf Sweet Pea. In 1896 the world was supplied with the product of that one seed, and whatever the merit of "Cupid" was, it certainly illustrated the enterprise of a modern seed-house in multiplying and distributing the product of so small a thing as a single seed.

Coming back to Mr. Eckford's work, we owe Boston a debt for

leading the way to the popular interest in the Sweet Pea. Your annual Sweet Pea exhibit was already a regular thing and creditable before the rest of us saw anything very remarkable in them. I remember with what kindness Mr. Robert Farquhar first gave me Mr. Eckford's address, and I never forgot his wise injunction to use the confidence with due caution. I did so as long as I could, but the wave of Sweet Pea interest swept over the country, and I felt that the truly American thing was to help it on in every way. I suppose Boston has reaped its share of the profit coming from the sale of probably one hundred and fifty tons annually of Sweet Pea seed in this country. Seven years ago your catalogues were cautious about recommending the Eckford novelties, and well they might be, for to this day very few of the imported Eckford packets show up well the first year in our rigid New England climate and uncertain soil. You must have them if you keep up with the procession. Almost every seed of these imported packets does well on the Pacific coast, and American grown seed one year from Mr. Eckford's introduction is strong and shows us these novelties very nearly at their best. No one who is well up on the subject of this flower questions the remarkable merit of the finest Eckford novelties. And I believe we are to put such competitive interest into this flower that we shall hold Mr. Eckford's novelties up to their highest standard in size and quality. Canada seems to suit them well. From letters received it is evident that enthusiasm there is running high on Sweet Peas. And places along our northern border, sections also where they have a rich alluvial soil, up in the Northwest and the whole length of the Pacific coast, — in all these localities they can smile at the difficulty of growing the finest sorts, and giant blossoms are no fiction with them. I receive through the mail the pressed standards of blossoms measuring an inch and nine-sixteenths in width. When you have a blossom that exceeds an inch and a half, it looks like a hollyhock to an enthusiast. One grower is at work on a giant-flowered strain. Another writes me that he is developing a strain with five blossoms to a stem. By these signs I have ceased to be anxious about the retrograde of these fine things. We are going to have seed soon that is not spoiled by the jobbers' calculation to the quarter of a cent per pound on the quantity harvested per acre. Giant-flowered Sweet Peas are not made in that way, nor held up to the Eckford type.

Now we have just come into Mr. Eckford's finest work. He has gone very cautiously. He has the soul of a careful, painstaking, conservative florist. And he has been among aristocrats enough to become a dear old aristocrat himself. He has not had to beg any favors from the trade, and now he says, If you want this new set of advance novelties the price will be fifteen shillings whether you take one set or a thousand sets. Heretofore we have been one year behind on his novelties, but by paying the retail price they are open to us without any conditions. We are already at the point of Mr. Eckford's finest work on each color, and the time has come to sift the list of varieties thoroughly, and discard a large number of inferior sorts. We can now select a royal group, and hold them up to the finest grandiflora type. We can bring the number down to thirty. Mr. Eckford still has a rich treasure in his advance seedlings. He has a white that will surpass all previous white sorts. He has finer blue than we have yet seen. Doubtless a great quantity of cheap seed will be grown for our common trade, and at current prices little effort will be made to grow such stock for quality, and, since the great bulk of Sweet Peas are sold in mixed form, the cheap pound and packet trade will be satisfied with this field-grown stock.

A word about Mr. Eckford's gardens at Wem. It is a short, pleasant ride down from Liverpool past Chester and Whitchurch to the old-fashioned, huddled town of Wem. After a few minutes' walk outside the town along the English lanes you come to a high-hedged floral bower with high padlocked gates, through which you see the bright evidences of high-class gardening. Here is Mr. Eckford's floral workshop, five acres in extent, soon to be enlarged to take in four acres more.

Mr. Eckford does not grow his trade stock here. Indeed, his great perplexity is to get his novelties properly grown for the trade. Of late his trade stock has been grown down in Essex, a great seed section.

The most noticeable part of his Wem garden is two acres of what he calls his seedlings. In this he plants all his selections of seed, from the latest work, of every color. From this field of seedlings he selects such as he wishes to prepare for trade introduction. It was a rich treat to wander back and forth through those two acres of rows. They are all bushed enough to keep them off the

ground. At every step I could see improvement on all those varieties that have been offered to the trade. And the new and richer colorings extorted exclamations of pleasure. Mr. Eckford's keen eye detected at a distance the flashes of improved color, and his enthusiasm seemed unbounded. Now he says, "I don't get a shilling from all this two acres." Of course not! This field of seedlings is his treasure house, and must be carried along patiently year after year to make selections from. The new shadings run in all directions. At Wem, on the soil there found, and under the favorable conditions for color and size peculiar to the English climate, the blossoms attain a wonderful perfection. The vines were not remarkably thrifty, and there did not seem to be the abundant florescence that we have at times on this side the water, but every flower had the aristocratic look, as if some master hand had grown it. Delicate shadings, that will be lost under our extremes of sun and cold, are there developed to the finest degree. It is beautiful to read the language of color under those English conditions.

Mr. Eckford kept to himself all the secrets of his method of making these beautiful varieties, but the results of his work were abundant all about. In making up a new set of novelties, Mr. Eckford puts in about three or four of the highest grade sorts, and fills out with others not so highly developed. I would not complain if he doubled his price on the best sorts, and kept the others back.

As fast as he makes a selection for a new set, he plants a row of each for his own stock seed, and tones them up to the best type and then sends that seed to his grower to grow trade stock. We have been disappointed quite frequently in the results we get from the Eckford sealed packets, but the source of the difficulty has doubtless been in the poor growing of the Eckford seed stock after it leaves his hands. Certainly, as I saw the rows at Wem in preparation for seed, the blossoms were in every case of the highest quality, and true to description. The English conditions for growing seed of this flower do not compare with our Californian conditions. It requires two years of California growing to get back the Eckford quality of the novelties.

As Mr. Eckford has been the chief factor in giving us the improved Sweet Pea, so California is the second great factor in the growing of this flower. On the invitation of C. C. Morse & Co.,

of Santa Clara, California, I spent the month of May, 1894, with them. The chief point at that time was to set them right on the names and types of the already long list, so that all stocks might be thoroughly rogued. It seems but yesterday since we doubted whether Sweet Pea seed could be successfully grown in this country. But California is today supplying the best trade stock we have, and we are exporting this seed to the countries that but a few years ago were our sole dependence. Even two years ago none of the foreign growers were keeping up with Mr. Eckford's novelties, and were taking pains only to preserve the purity of color of the reliable sorts. As compared to a California grower, who, to fill any possible contract for every known variety, does not hesitate to plant two hundred and fifty acres of this one flower, the foreign growers can hardly be said to be in the market. California has a wonderful strength of soil, cool nights and warm days, and, the rainy season coming just after planting time, the root growth is excellent, and at harvest time they are sure to have continuous sunshine. Their chief danger is over-production. Messrs. Morse & Co. plant Sweet Peas about as we plant corn, two seeds in a place. Up to the first of June they can get in with a hoe, and to rogue out the "off" kinds, and after that the vines lock in together, and, with never a wind to beat them down, the whole field rises from three to five feet high, forming a mass of bloom, and going evenly to seed. Other growers plant them in rows about seven feet apart, and work among them all through the growing season. They are careful about saving seed stock. While rogueing them they are on the lookout for the finest plants producing the best blooms. These are marked with a stake, and saved for their own seed stock. Rogueing out off colors is only one-half what is needed. Deteriorated stock should be pulled up also, and nothing should be allowed to grow but plants fully up to the improved type. But our jobbers do not take this into consideration in fixing contract prices, and drive the grower into harvesting everything that will make weight. The California grower needs to bear in mind that if his stock is in the least deteriorated it will show in New England far more than in the rich soil of the Pacific coast. We must say this about our best California growers, that they are very enthusiastic about their Sweet Peas, and now they have reached the most interesting stage of their work — the making of novelties. With such a large acreage

to go over, they have a grand chance to find advance marks in size and quality and variations of color. The American novelties of next year will show real merit, for they are the first that they have obtained from hybridizing. Mr. Eckford's stock is now in a highly hybridized condition, and as they plant a large number of his packets they frequently break into new things, and by crossing his finest sorts they break up and show many of the grand advance novelties that Mr. Eckford has been holding back.

I shall be expected to refer to rules for the culture of this flower. Those who failed last year had plenty of good company. Only one of our Springfield enthusiasts succeeded well. Nothing comforted me more than to hear from Mr. J. F. C. Hyde that he too had joined the ranks of the unfortunate ones. The causes of failure prevailed from one end of the country to the other. Every exhibit was made at a great disadvantage. I bent all my energy to escaping the blight, and succeeded beautifully in that, only to see my vines go up, up, up, ten feet, blossoming in a scattering way after they were five feet high. There were two main causes; the first was that we had no freeze or frost to check a rapid start, and this was followed by excess of rain through the growing season. One of the worst vices of the Sweet Pea is an occasional tendency to rank vine and no bloom, and last year we had exactly the conditions to produce that. The high culture we give them nowadays necessitates a slow germination and a holding-back by frost, to steady them down to moderation in making vine. I have been preaching to our people some about the principle of making a plant work, in order to increase bloom. The root is the part of the plant that works, and the stiffer or firmer the soil the more wholesome exercise the root gets. A vine like the Sweet Pea should not have a soft bed underneath it. It induces a less hardy growth of the plant. It indulges the root and weakens it for its after work. It favors a top growth beyond the power of the root to support it. It stimulates growth at the expense of bloom. We have been following the trench system, which means that people have dug down and filled in with loose soil and fertilizer, and the very looseness of this bed under our seed and vines has been enough to make mischief. It should be trodden down. We have weakened the plants by this soft treatment, and

then have imprisoned them at the tenderest age down four inches below the sunny surface of the ground, and suffocated them still more by filling in the earth before they were at all hardened. Hence the blight. I have in preparing directions for other people kept in mind those who have a more or less light loam in their gardens. For all others who have a clay loam I feel but little sympathy, because they ought to have fine Sweet Peas with only half trying. But we had better all of us be shy of the trench method. I have a soft spongy soil well enriched. I had it turned up with a plough last fall, running the plough twice through each furrow. I shall simply hollow out about two inches where my rows come, treading the soil down if I find it soft. I shall in these shallow hollows just scratch out lines an inch deep for my seed, and cover only an inch, and roll the soil above and along the sides. If you have clay loam it will settle enough; only do not make any soft bed underneath your seed. I believe in thorough spading in the fall for the purpose of mixing, but I should let the frost be my plough for the spring. I believe this firming of the ground, avoiding the other things that have smothered our tender vines, will stop the blight. I am greatly annoyed with ground moles, and shall resort again to tar paper, setting pieces one by two feet in size into the ground every few feet to prevent their running lengthwise of the rows — and catch 'em if you can! Of course you all plant your Sweet Peas as early as possible. If the Sweet Pea gave us no other pleasure, it bids us hail with delight that first premature spring day, after the frost is out of the warmest part of our garden, for that is the foreordained time to plant this seed, unless you continue to set apart Fast Day for this purpose. You know by experience that you must plant seed liberally enough to allow for various losses. I adhere to the plan of planting in double rows, sowing at the rate of an ounce to ten feet. You ought to use more than that if it is cheap mixed seed. But after all losses the plants should not stand nearer than three inches apart.

Now for the cutworm. Some of the devils that did not go into the swine went into this grievous garden pest. If I open my mouth to boast that I don't have many of them I shall surely have my pride humbled soon. I say in good faith that in so beautiful a thing as a row of Sweet Peas it is a disgrace not to come out ahead of this foe. I believe first in going at him in the

fall just as soon as the frost has spoiled things. You can burn rubbish over the ground, put on a good dressing of salt, and freeze them out by spading up as late as possible. Mr. Eckford recommended gas lime, and some of you saw an account of the way Semple, the great Aster man, ploughs unslacked lime into his soil. The fall is a grand time for making a piece of ground very unpleasant for cutworms or their eggs. I find virtue in the bran and Paris green treatment. A pail of bran with a tablespoonful of the poison stirred in, and sweetened a little, and sown on the surface, or lightly hoed in in the spring, is a simple remedy. Diverting the cutworms by planting something of no value alongside for them to feed on helps to save some choice things, but you will enjoy your breakfast better if, Samson-like, you go out and slay a hundred of them as an appetizer. The only thing this good advice lacks is some professional charge, for we follow advice only when we pay for it.

The past two seasons have brought another pest: I call it a louse; perhaps you would call it red spider. It begins at the base of the vine and colonizes on the under side of the foliage. Its presence will be seen by the whitish, translucent spots on the leaves. It must be gone at vigorously either with tobacco tea or a strong force on the hose sprinkler. I used the latter, but with the excess of rain last year it did make the vines grow most wonderfully at an expense of bloom. Last year was surely an "off" year and does not count. The other rules for culture are simple and threadbare. Bush or trellis strongly, and so as to give them room to ramble. Water freely after the blooming period comes, but not too much before. Run the rows north and south to give them both the morning and afternoon sun. You are favorably situated here for easy success in this flower — almost anywhere near the sea coast they thrive.

Discussion.

President Appleton here retired and the chair was taken by Vice-President Benjamin P. Ware.

In reply to an inquiry the lecturer advised for cutworms to use six quarts of salt to one square rod. He said he would never trench again, at least not deeper than the ordinary furrow.

Ex-President James F. C. Hyde said he had suffered from the blight. His vines have grown as high as ten feet. He said he

should never again plant in a deep trench and should be extremely careful about earthing up; early earthing is disastrous. The cut-worm is a great pest, but he would not recommend the use of salt; he would plant lettuce to attract the worms from the Sweet Peas or other crop, and use the thumb and finger; this is the best remedy. Eternal vigilance is necessary; go over the rows at least once, and better twice, a day. This is his method, and he has taken many prizes in his day. Black shallow soil is best, and he believes in firming it, as good flowers cannot be grown on light soil without a great amount of attention. Be careful about the seed, and don't expect to get good results from Eckford's seed at first. He still believes in Sweet Peas, and thought Mr. Hutchins had taken the highest position in regard to them.

Joseph H. Woodford inquired what fertilizer to use and when to apply it.

Mr. Hutchins answered that it was always best to aim to get the soil as fertile as possible. Use stable manure and trench, as it is important to get the food into the ground and to deepen the soil; with eight inches of well-firmed soil above the manure or compost you are pretty safe. Never apply fertilizer in the spring, but hold it over until fall. Commercial fertilizers, such as phosphates, act rapidly; these are not needed at first. He would not apply wood ashes in the spring. Bone flour can be used safely at almost any time. A New Haven florist puts four inches of tobacco stems in the bottom of the trench, with good results; they contain a large amount of potash.

Giving a list of the best sorts is very difficult, as it means something different to the florist, the lady amateur, and the pocket-book.

In whites the best is Blanche Burpee, and this is what the amateur wants. The Bride is the same. Emily Henderson is better for cut flowers if you can get it to bloom freely. Mrs. Sankey is good, but has rather gone by.

In pink-whites use Blanche Ferry.

For rose pink, Prima Donna, Royal Robe, and Katherine Tracey.

The best shaded pinks are Apple Blossom and Royal Rose.

Of soft flesh pinks Gladstone has given place to Blushing Beauty.

For a peachy pink use Lovely; this might be called a shell pink, and possesses good qualities.

In buff pink we have Venus, which is very fine.

For bright rose Her Majesty is the best; others are Oddity and Splendor, but we do not need these.

Deep rose is found in Mikado, which seldom comes striped; drop Adonis, as it is not good.

In light scarlet use Prince Edward of York.

For scarlet, Firefly and Harvard; drop Invincible Carmine and Invincible Scarlet. For deeper scarlet we have Mars. For a cherry red, Salopian, which, however, is very expensive.

For orange salmon use Meteor and drop Orange Prince.

For orange rose, Lady Penzance.

For reddish primrose take Emily Lynch and drop Duke of York.

For rich purple, Duke of Clarence.

For black purple, Monarch.

For indigo, Indigo King.

For dark maroon, Stanley.

For blue, Captain of the Blues.

In lavenders we have lost one; they are the hardest to make hold the color; use Celestial or Burpee's New Countess.

For reddish mauve, Emily Eckford and Dorothy Tennant.

For magenta, Captivation.

For claret, Waverly.

For primrose, Mrs. Eckford; still good.

For primrose cream, Queen Victoria.

For scarlet striped, America.

For pink striped, Ramona.

For purple striped, Senator.

For blue striped, Princess of Wales and Gray Friar.

For orange striped, Aurora.

For deeper orange, Coronet.

For description of these varieties the booklet of the Sunset Seed Company will be found valuable.

Frank O. Carpenter inquired about Cupid.

Mr. Hutchins replied that it has a certain historic value; we need a hybrid race which shall be half dwarf, and this variety seems to be what we have wanted to work with by crossing; this is its only value, as it has short flower stems as well as dwarf habit. It does well on the Pacific coast, and will do better here than it has done. It originated in a field of Emily Henderson in the fall

of 1893, one plant only being found. The speaker had no trouble in getting it to bloom.

James Wheeler spoke of Red Riding Hood as looking deformed rather than pretty, as though it was going back a hundred years, and said it is a shame to put bad things on the market.

Thomas Harrison said that the lecture took him back fifty years, when some Egyptian Peas sent him gave a race similar to the present Sweet Peas. It was supposed to have been found in ruins in Egypt, when Sir John Gardner Wilkinson was exploring there, and was sent to an English firm to propagate and introduce as a Vetch.

Robert Farquhar thought it was Vicia, not a Lathyrus; no improvement to the Sweet Pea has come from Vicia. Cupid is undesirable; we want size, color, fragrance, and length of flower stalk; also strength to the stalk. Twelve years ago very few Sweet Pea seeds were sold in Boston; twenty-five years ago the leading firm had only one and one-half bushels; now we have quantities. Seeds from England are beautifully developed; much better than those from France and Germany. The speaker said that in two years his firm trebled their sales. To Mr. Hutchins, more than any one else, we are indebted for the magnificent development on this side of the water, and more than one-third the specialists on Sweet Peas are in this country. Mr. Hutchins' short list of good varieties is very good; it is just what the seedsman wants. We have to contend with a bright sun, which they do not have in England.

Benjamin P. Ware said that the best fertilizer for edible peas is ground bone or flour of bone. It supplies phosphoric acid and is adapted to produce flowers and fruit rather than vines. He would use it for Sweet Peas also, putting it on in the fall; though its effects might not be seen at once they would be lasting. Cutworms cause market gardeners a great deal of trouble; acres of onions have sometimes been cut down by them. Wherever you find a Sweet Pea or other plant cut down by them during the night, which is when they do most of their work, you will, if you dig for him in the morning, find the worm near by.

Mr. Harrison asked whether Sweet Peas are subject to the pea weevil.

Mr. Hutchins replied that of late years there had been few in

fresh seed — not so many as formerly. He had seen none this year or last.

Mr. Harrison remarked that we had no yellow Sweet Pea.

Mr. Hutchins said that though a Sweet Pea called yellow had been sold, the color was only a suggestion of yellow. Putting a good many together and bringing them into the house in the shade might bring out the color. Golden Gleam may be a deeper yellow, but he doubted whether a true yellow would ever be produced. Nature makes laws which limit our going beyond a certain point, but we are rapidly getting towards a blue.

California seed comes true in England and in the continent; the speaker had never known it to fail. Mr. Eckford's seed is grown under special circumstances. He always sows it in moderate heat for germinating only, to protect it from the rigidity of the climate. Then they can be put in the open ground. They can be transplanted easily.

In answer to an inquiry Mr. Hutchins said that the list given is suitable for amateurs. The kinds recommended are robust growers.

The thanks of the meeting were unanimously voted to Mr. Hutchins for his interesting paper.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 20, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

In the absence of the author, the following paper was read by J. D. W. French, Chairman of the Committee on Lectures.

SOME PHASES OF MARKET GARDENING.

By T. GREINER, editor New York edition "Farm and Fireside," La Salle, N.Y.

It seems to me too bold an undertaking for an outsider to come before your celebrated body of practical horticulturists — the leaders in their chosen field — with the idea of enlightening you on any phase of the garden business. We are in the habit of looking to you and to the printed reports of your proceedings for instruction, and for new ideas and suggestions.

It is not improbable, however, that an account of the development of market gardening, and of the problems with which your brethren in these more western districts are brought face to face, may be of some interest to you. I had hoped to tell you of this personally, and perhaps receive in return some words of wise counsel and consolation — some suggestions how best to meet the difficulties which beset us here, and how to lift the business out of the mire and ruts into which it seems to have fallen during these "hard times." Circumstances and previous engagements, unfortunately, compel me to entrust my own side of the story to paper.

Not Flourishing. — At the outset let me say that the business here has not been flourishing for some years. Every gardener is complaining. We used to have a good market in our near cities, and coin money freely. Now the free coinage of silver in the market garden has become a myth. The great problem before us is how to manage so as to be able to continue in the business, how to earn enough to cover the wages of labor, and to make a bare living from the garden.

Causes. — The causes of this unfavorable change are not far to seek. It has been brought about by the general depression in the values of other soil products, and aided and abetted by the constant advice (not altogether judicious) of agricultural writers and the agricultural press. I know I am not free from blame myself. But look up some issues of leading eastern farm papers (the "Rural New Yorker," for instance) of half a dozen or a dozen years ago. See the glowing descriptions of the results of intensive culture, of the profits to be found in vegetables and fruits; of the freely reiterated statement that the eastern States were destined to produce horticultural rather than agricultural products. See the sensational teachings found in earlier bulletins of the New York Experiment Station, and in speeches of the late director (Dr. Collier) about the great profits from forced crops. Note especially the glittering and tempting assertion coming from so high an authority, that a quarter acre under glass would give greater returns than a hundred acres of farm land, the amount of $11,000 (if I remember correctly) being figured out as the proceeds from one acre under glass.

Ruinous Competition. — Then came the great slump in prices of cereals, potatoes, etc. A large number of farmers who pre-

viously had contented themselves with growing wheat, oats, corn, potatoes, and stock, finding loss rather than profit in their accustomed crops, and being tempted by the often extravagant promises held out to them of better returns in garden and fruit crops, forsook their legitimate products, and began to grow berries, onions, and a general line of garden vegetables. As a result, the markets became flooded with these products, and prices in many instances were forced down below the cost of production. So we older gardeners met loss instead of profit, and the new-comers in this field have found nothing but sore disappointment.

Possibly you, near the seashore, and with the wealth of the country concentrated around you, have been less affected by these changes than we were here. But I find from the market reports that the big eastern cities also were glutted with garden products, and prices have ruled lower than ever. Growers of forced vegetables of all kinds, too, have suffered from ruinous competition. Of mushrooms — once a great source of profit — there were at times more than could be sold. Hothouse tomatoes and lettuce were plenty and cheap, and there seemed to be in the markets a plethora of all vegetables and at all times.

Too much Instruction. — I believe that we have instructed too much. What used to be trade secrets are now the common property of the masses. Tuition has been practically free, and the masses have learned to grow articles the production of which used to be the business and privilege of the few. We have written too many articles, books, and pamphlets. Stations have aided with their bulletins, and societies with their free lectures and discussions. The urgent appeals for the production of garden and fruit crops have been too persistent and over-emphatic.

No Welcome for New-comers. — While the general effect in bringing the blessings of a fruit and vegetable diet within the reach of everybody who in any respect deserves to be called a consumer may be wholesome, thus justifying somewhat the course of those who have helped towards this result, we shall have to modify, if not reverse, our teaching of a quarter of a century or more, and now try to discourage the tendency of the many unskilled outsiders to rush into market gardening as a supposedly profitable business. There are too many producers of trash in it already. Market gardening has now entered a stage of development in which a thorough weeding-out seems imper-

ative and inevitable. The less skilled portion of its devotees will have to drop out, and only the fittest can survive. It is time for us to warn those who, having made a failure of general farming, clerking, store-keeping, or office-holding, intend to take up gardening without previous training and experience. If our efforts to scare them off are successful, it will be a favor to themselves as well as to those already in the business. It will prevent undesirable competition for the latter, and save the former certain disappointment and loss of time and money.

Trash not Profitable. — That the production of trash does not pay has been reiterated almost *ad nauseam;* and yet the markets are filled with trashy stuff that weakens and depresses the prices of even the better grades of goods. Really superior vegetables may suffer in this competition, but they seldom fail to find a fair demand and comparatively fair prices. In a few lines we secure even our old-fashioned good figures. Possibly the depressed condition of the market garden business may prove a blessing in disguise, by discouraging raw recruits from coming into our ranks, and by thus preventing a further increase of trashy production. Possibly with the return of old-time general prosperity (another period of which seems now about due us) the consumption of garden products can be increased to such an extent as to give us again paying prices for the general line of garden stuff and good profits to the skilled grower.

To restrict Production. — Meanwhile it is in order to talk of restricting the production rather than extending it, especially in those lines which seem decidedly overdone, as, for instance, in that of onions and tomatoes for the late summer and fall trade. This is largely a local question. What special crops one can produce with best prospects of profitable sales is a matter which each individual gardener must settle for himself. It would not be safe to point out special crops as promising better pay than others, for that would only lead to a general rush and a breaking-down of the prices of the products thus recommended for more general culture.

Cheapened Production. — The talk of reducing the cost of production may have a "chestnutty" flavor; yet I believe the story has not been half told. It is true that the skilled gardener appreciates and utilizes every new implement put forth as saving hand labor in the garden, from the newer style seed drill to the

Breed weeder and the Bemis transplanting machine. It is true that he tries to get his soil in shape to bring the largest yields, and that he crowds his crops, following one with another in rapid succession, so as to make the most of his opportunities. There is one point, however, in which almost all of us have blundered, and made ourselves guilty of sinful extravagance. This is in the matter of purchasing manures.

Buying Plant Foods. — Every gardener is a buyer of plant foods in some of their forms. In most cases we have paid excessive prices for them. When the finished product sells for so much less than formerly, the raw materials should be had at correspondingly smaller cost. Yet the general lowering of prices seems to have made an exception in the case of plant food materials. We still pay old time rates, and in many instances even increased ones, for stable manure. This form of plant food is a waste product of stock yards and livery stables. If gardeners in the vicinity of the cities could agree to be less anxious to buy it at whatever the seller may see fit to ask, the latter would have to sell it for what you — the buyer — might see fit to offer.

I myself am more fortunate in this respect than most of my brethren in the gardening and fruit-growing business. By sharp bargaining I obtain first-class mixed stockyard manure, from grain-fed hogs, sheep, horses, and cows, at $17 per large car well loaded (capacity of car 60,000 lbs.), delivered here at the station, a quarter of a mile from my gardens. A ton of such manure thus costs me less than 75 cents; and, at the same rates that we pay for plant food when buying of fertilizer men, is worth easily double that amount. But not everybody has such a chance. In some cases we may be able to draw on home resources, by making composts of dried muck with ashes and bone, or with other forms of mineral plant foods, and using such composts in place of the stable manure when that cannot be had except at an exorbitant price. I offer this only as a suggestion.

Concentrated Plant Foods. — The great majority of gardeners also use concentrated plant foods, and sometimes with telling effect. Yet in their purchase we have been careless and extravagant. I do not like to antagonize that powerful body of men, the so-called fertilizer manufacturers. We need their coöperation. They have had a mission. Like the nurserymen they had to send their agents among the tillers of the soil to induce them to

make use of a good thing. This agent system of selling, however, is expensive. Then there are bad debts, and debts of long standing, and interest on the investment and outstanding claims, and a heavy expense in advertising, and other outlays and losses, so that, taken altogether, the fertilizer men may have to charge us the going rates for these plant foods in order to make their old-time profits. But why should they not be satisfied with smaller profits when we and all the rest of the tillers of the soil are obliged to do this?

Pertinent Queries. — I will add a few more pertinent questions: Why shall we, who know what we are doing, and who try to do a fair and square business on an economical basis, help to carry the losses of poor sales when there is absolutely no necessity for it? Do we really need ready mixtures? Do manufacturers pretend to know more about the needs of our special crops in each special case, or on our special soil, than we do? Is one and the same mixture just what is needed for any one crop under all circumstances? Is it not absurd to talk about special onion manures, special potato manures, special cabbage manures, etc., when the conditions of the soil on which each individual crop is planted vary so much? Who will tell us whether a certain crop needs exactly six or eight or ten per cent of potash? Why will manufacturers sell their slightly differing mixtures of three simple food elements, in slightly differing forms, under twelve hundred different trade names?

Home Mixtures. — I can see no necessity for using ready-made mixtures in the garden, but the strongest reasons for avoiding that course. Let us examine the fertilizer analyses as given, for instance, in one of the latest bulletins issued by the New Jersey Experiment Station (New Brunswick). The mixtures sent out by our various firms as especially adapted for garden crops vary in real value between $20 and $26 per ton, and sell at from $30 to $40. In other words, the purchaser is asked to pay the full value of the article and an additional fifty per cent of its value to make good expenses and losses of the seller, and to swell his profits. Now if we buy the following ingredients:

500 lbs.	nitrate of soda, costing about	$11 25
1,200 "	dissolved South Carolina rock, costing about .	6 00
300 "	muriate of potash	6 75
2,000 lbs.	. . . . .	$24 00

we have a ton which contains about four per cent of available nitrogen, nine per cent of available phosphoric acid, and seven and a half per cent of potash (K_2O); cost us $24, is worth $27.90, and the equal of a fertilizer sold by manufacturers at about $40 per ton. Professor E. B. Voorhees, director of the New Jersey Station, suggests the following formula for garden crops, viz.:

Nitrate of soda	200 lbs.
Dried blood	200 "
Tankage	200 "
Acid phosphate	1,000 "
Muriate of potash	400 "
Total	2,000 lbs.

This mixture will analyze about three and a half per cent of nitrogen, eight per cent of phosphoric acid, and ten per cent of potash. In cost and value it is not materially different from the other.

Applying Plant Foods. — Some gardeners may fear the labor of mixing. But why mix these ingredients at all? Nitrate of soda and muriate of potash are as easily sown over the ground, broadcast, as wheat. Acid phosphate can be slightly moistened by sprinkling and working over on a tight barn floor, or in a wagon box, and then applied by hand. When we have a chance to effect a saving in cost of from $12 to $16 per ton, we can well afford to expend a little extra labor in application. My practice is to sow each ingredient alone, taking pains to distribute the proper amount.

Direct Dealings. — A prolific source of loss to us has been our carelessness in selling to irresponsible buyers, and in consigning products to commission merchants. For us here, the only safe way seems to be to deal directly with consumers, and in rarer cases with retailing grocers, for cash only. If we have superior vegetables, we can usually find private buyers willing to give a fair price. Our grocery stores are not satisfied with reasonable profits. Just at this time they are unwilling to pay to the grower more than from 25 cents to 30 cents a dozen for the very choicest of hothouse lettuce, while they are unwilling to sell the same at less than 10 cents a head. The only thing we can do is to hunt up consumers ourselves. Our way to treat commission

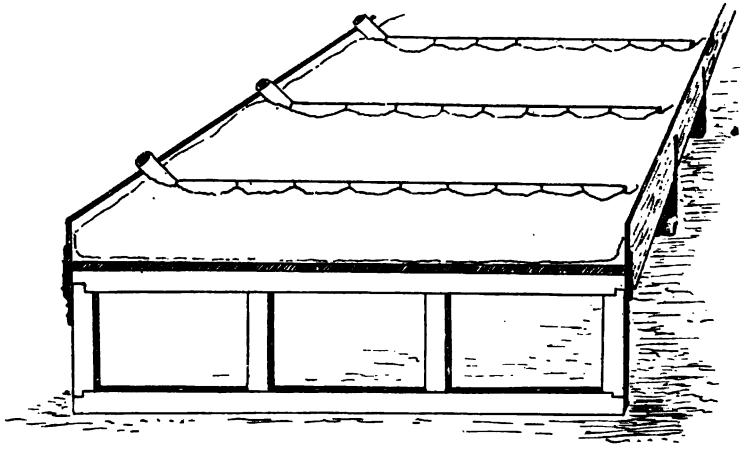
merchants is to give them no chance. If we ship anything to them we soon follow the goods, and keep watch of the dealer's doings until the money is in our pockets.

Nitrate of Soda. — No single plant food has ever given me the striking results which I frequently obtained by the use of nitrate of soda, especially when applied to beets, spinach, cabbages, and cauliflowers, either alone, as in the case of the former two, or in combination with muriate of potash, as in the case of the latter two. Sometimes the effectiveness of the nitrate has been further increased by the simultaneous use of lime, and maximum results have thus been secured at a minimum cash outlay. We have usually applied nitrate of soda at the rate of from 200 to 300 pounds per acre, and muriate of potash in slightly smaller quantity, both broadcast. These fertilizers are always worthy of trial in growing the garden products named, and perhaps in growing others.

Some Remunerative Crops. — The following brief remarks may suffice in regard to what we consider our money crops: Early peas come first, and we find them profitable if we grow only what we can dispose of directly to consumers. Strawberries, when properly managed, have never yet failed to give us fair returns, even when disposed of at wholesale to groceries and commission houses. We have quick sale, at good prices, for first early tomatoes, and the only trouble is that even with all the pains we take we can get only a small portion of the crop on our earliest plants to ripen before the great rush knocks the props from under the tomato trade. The Early Ruby type of tomatoes (including the newer Leader), which bloom and set fruit freely even on the young plants under glass, give us some very early fruit, and we are in hopes of finding before long a variety having these characteristics, with uniformly smooth fruit of fair size. The Prizetaker onion, grown on the plan of the so-called "new onion culture," has been one of our most profitable crops, and the Barletta pickling onion ranks very high with us as a money-maker. There is a good demand, seldom fully met, for these very small, white bulbs, and even when sold through the regular commission channels they have netted us over $3 per bushel. The crop is produced with little trouble inside of three months, brings cash returns early in September, and leaves the ground in good shape for a succeeding late crop, like celery, spinach, etc.

Among other crops that we can rely on for some profit are late cabbages, which bring from $12 upwards per ton; melons, especially of high-flavored varieties like Emerald Gem; and Hubbard squashes.

Newer Devices and Methods. — Few of the newer implements have been such a help to us as the Meeker smoothing harrow, although it has imperfections and the great drawback of high price. We now hope to find in the Clark's cutaway smoothing harrow an implement costing less than half as much as the Meeker, and doing fully as good — in some respects perhaps better — work. The Breed weeder and Bemis transplanter have already been men-



Bench, double width, arranged for sub-irrigation. Tiles laid in cement. This bench has been in use with me for two seasons.

tioned, and they are found to be great labor-savers. Among newer methods there are two which have left a deep impression on our garden practices: The one is the so-called "new onion culture," which has enabled us to make the Prizetaker and New Gibraltar onions very profitable within the limits of people's appreciation of mild flavor, and of their willingness to buy onions of very large size. The other is the new system of applying water to greenhouse crops, namely, by sub-irrigation. This seems by far the safest plan for lettuce beds, and it has enabled me to grow finer, larger, and healthier plants, especially of the hard-heading newer forcing sorts like White Perfection, New Hothouse, etc., than the old way of surface watering ever gave us. The accompanying

sketch shows the bench as I use it. The bench is made of a two-inch plank bottom with sides of four-inch board, resting on a frame of three by four scantling, and made water-tight by means of a cement lining. Lines of two-inch tile are laid upon the bottom across the bench, two or two and one-half feet apart, the end tile, which receives the water, turned up at an angle of forty-five degrees.

I shall have to pass over for this time other subjects which might be worthy of fuller notice, such as the need of more thorough cultivation of the home market and the hopes with which some of our brethren in these border towns look upon coming tariff changes as means to free them from the formidable competition of Canadian gardeners, and thus to bring about at least a temporary rise of prices in garden products.

In conclusion, let me express the hope and wish that the return of old-time prosperity may be close at hand, and that we may thus be relieved of all further anxious speculations and doubts as to the future of market gardening. We have full faith that all will turn out well in the end.

Discussion.

Benjamin P. Ware said that he had been pleased with the character of this paper, and happily disappointed. It had not told us of the theory and practice of market gardening and he was glad of it; it had given us what we need. As the prices for produce diminish we must adopt some method to reduce the cost of production, and the importance of reducing the cost of production has been brought out. In business today we find the waste products are used to manufacture new articles, but we farmers and gardeners are the most extravagant of all. He wanted to emphasize that we can save one-third or one-half the cost of fertilizers by mixing them ourselves. We must buy the raw materials and mix them ourselves, and use what our crops require. The mixed products on the market are not what we want. He did not know why such mixtures are made. We must learn from the experiment stations what we need, and mix as our plants require. Mixed fertilizers do not supply that. Professor Jordan, at a farmer's institute in New Hampshire, which the speaker attended, emphasized the idea that we should contract with agents for the materials, and that a saving of fifty per cent can be made by

so doing. Advantage must be taken of these things; we have put before us in bulletins what we need for our plants and animals as well. Mr. Ware asked his fellow-farmers and market gardeners whether they were willing to pay this extra profit to the manufacturers. If they were they might do it; he would not. Mixtures are all humbug; names are used to catch your eye; if one does not, another will. He approved of the method presented; we must see where we can save anything and save it if we wish to succeed. Mr. Ware concluded by calling on one of our fellow-workers, Mr. Sullivan, of Revere, whom he saw in the audience.

Mr. Sullivan, after thanking Mr. Ware for the call, said: Labor is the first great expense, but if we try to reduce the wages of our laborers, and thus reduce the cost of the produce, we commence by making our own townspeople poorer; they must live, and their children must go to school. As it is now, they have a hard time. Italian laborers are now getting plenty, and work for very small wages, but is it desirable labor to hire? We have given them a fair test, and find that to a certain extent they can be employed, as for weeding and the like, but if you do not have an interpreter you cannot explain to them what you want done, and a foreman is required to stand over them continually. They are willing and good workers, but as they cannot understand the English language we have come to the conclusion that we cannot afford to reduce the wages of present laborers. Another point is the cost of manure; this has been well explained in the paper. We are paying too much already. In the city of Chicago, and some other large cities, manure is given to the gardeners by the stable-keepers; the gardeners thus get it for the hauling, which often amounts to $3 or $4 per cord. This is a help. Mr. Sullivan said, in regard to fertilizers, that he had used them in all forms, and understood all about the manufacture of them and the ingredients used. Taking the material in gross, there would, without doubt, be a saving of fifty per cent, but mixing this material is not general, and many have not the intelligence that Mr. Ware has to put into the mixing. If the fertilizer dealers would be satisfied with small profits, say $25 per ton for their fertilizers, the farmers would be satisfied. Some fertilizers must be used, but we are at present dissatisfied with what are now on the market. The manufacturers will come down, and the sooner the better. We are protected by the experiment stations, so that

the fertilizers put on the market are true to the percentages marked on the bag, but the price is so high now that we are driven to lessen the consumption.

Hon. Aaron Low expressed his appreciation of the lecture. The great problem in market gardening, he said, is the production of crops at low cost. If we cannot get the price necessary to pay expenses, we must have lower-priced labor. We want to get our money's worth in everything, and he did not see why a farmer could not mix his own fertilizers. All understand what is needed by the plants — nitrogen, potash, and phosphoric acid. Apply nitrate of soda first, then muriate of potash, and finally some form of phosphoric acid; apply separately and harrow. The progress now being made does not lessen the labor much. Products are continually bringing lower prices, while the labor required remains the same. Agricultural industry is depressed all over the country; this is caused by over-production, and also, to a great extent, by the reduction in prices. Our foreign population hawk around produce of inferior quality on our streets; this has a bad effect, reducing the prices of good articles. If the farmer cannot use manufactured fertilizers and make them pay, he must use something else. The speaker uses fertilizers a good deal, being so situated that he cannot get anything else. Each must answer the questions as to what fertilizer he shall use, and whether he shall get them separately and apply them separately, or mix first, or whether he shall get them all mixed.

Another gentleman said all soils are different; he tries to restore the original elements to the soil. He always asks himself how he can best restore the fertility of his soil and bring it back to the original condition.

Joshua C. Stone said he did not believe fertilizers all humbug. He lives near the abattoir and knows that all done there is done openly. It costs them thirty-six dollars a ton to make their fertilizer and they will sell it for thirty-eight. Others might buy what they think best for themselves; he would not give up manufactured fertilizers. You can put manure on one-half of an acre of land and fertilizer on the other, and if the fertilizer does not give better crops the manufacturer will return your money. He called that honest. They also admit that there is no fertilizer equal to barnyard manure. He did not like to see them handled in this way when they were not present.

Kenneth Finlayson told of his experiment with mixing fertilizers. He said farmers have the brains, but not the experience, to mix fertilizers. He uses extensively under glass a fertilizer consisting of Canadian unleached wood ashes, guano, and soot; this gives fine results. In the absence of soot he once used the other two, which acted on one another in such manner as to liberate the ammonia, and as it was a cold night the conditions were such that the ammonia destroyed the leaves of all the roses to which the fertilizer was applied. His point was that the manufacturers of fertilizers would not make such errors.

Mr. Low said that ashes should not be mixed with any manure, as it liberates the ammonia.

Mr. Ware did not like the statement made by one speaker, that market gardeners have no brains. There is no business in which the chance to use the sciences is so marked as in market gardening. He did not see any difficulty in mixing fertilizers; all we need is a barn floor and a shovel. Empty the bags of separate materials, giving the proper percentage of each, and then mix. The expense of mixing is about fifty cents a ton. The ammonia is the most expensive part of fertilizers. Don't accuse us of ignorance, Brother Stone.

Mr. Stone answered that if we saw Mr. Ware's crops we should understand his meaning.

Mr. B. B. Butler said that he understands that it is the nitrogen which starts the leaf growth on plants. Why, then, do we need to mix at all?

Mr. Ware replied that the mixing was merely a saving of the labor of putting it on. You can put on three handfuls at a time just as easily as one.

Mr. Butler asked how much does going over three times amount to?

Mr. Ware said we put nitrate of soda on for the leaf growth, and the rest to get the crop, so that we should apply the nitrate of soda when the crop needs it. Phosphoric acid and potash are not needed then. Apply the nitrate in small quantities.

Dr. Crozier said there is one loss in artificial fertilizers which has not been mentioned. If we buy a ton of superphosphate of lime, what do we get? At least fifty per cent of sulphuric acid and water. The acid has united with the larger part of the lime as an insoluble sulphate, and the phosphoric acid is in the form

of a soluble biphosphate of lime, which must be neutralized by the alkalies in the soil in order to be used by the plants. When South Carolina rock is used in making the superphosphate, much of it reverts and becomes permanently insoluble. Phosphoric acid is almost the only constituent of modern fertilizers which admits of a reduction in cost, as nitrate of soda and the various forms of potash are probably as cheap now as they will ever be. Minutely divided bone dust will be found to be the most satisfactory form in which to use phosphoric acid, as a large proportion is available for present use, and the residue is rapidly brought into condition for future crops.

A mixture of half a ton of cotton-seed meal (a cheap and continuous source of nitrogen), six hundred pounds of nitrate of soda, half a ton of high-grade sulphate of potash, and one ton of pure bone flour will meet the requirements in most cases.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 27, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE in the chair.

The following paper was read by the author:

GOOD FOOD FROM THE GARDEN.

By Miss ANNA BARROWS, Managing Editor "American Kitchen Magazine," Boston.

Since the Massachusetts Horticultural Society has asked a woman to address this meeting, presumably it wishes to look at the interests which it represents through the eyes of the housekeeper. This is a hopeful sign, and indicates that in the near future producer and consumer may coöperate to secure the best interests of both parties. Today they seem to be separated by a multitude of middlemen, who, perhaps from ignorance of the best methods of handling garden produce, often injure rather than help this branch of trade.

The gardener, the marketman, and the housekeeper should have frequent conferences, to the end that all people should be better fed; that the human body may repel disease and temptation to crime, and may be able to bear the heavy burdens of the twentieth century. Let us look at the possibilities of obtaining good food

from the garden in the past and at the present time, and then consider what may be done to improve the supply of such products and increase their use in the future.

The successive stages by which our present methods of feeding ourselves have been evolved from the customs of primitive man form an interesting study, which is of especial value to those whose business it is to provide food for mankind. The earliest foods of races in warm climates were fruits and nuts, of which nature furnished an abundance, and which were eatable with little or no preparation. In some cases the women and children ate the natural fruit, while the warriors fed on dried fruit prepared with oil. Others subsisted mainly on raw flesh, and, perhaps by accident, discovered that new and agreeable flavors were developed by heat. Broiling or roasting over the open fire has been with all races one of the first steps in the art of cookery, and meats rather than vegetables were the objects of early experiments in this direction.

> "To cookery we owe well-ordered states
> Assembling men in dear society."

Savages found it a simpler matter to pursue their food rather than to take the chances of producing it from a fixed place. The placing of a hearthstone and the planting of seeds were higher steps on the ladder of civilization. For a nomadic life a larger area of country was required than is sufficient to support a given population by other means. Even grazing, which succeeded the chase as a method of supplying food, will not support a large population on a given average.

This is one of the strongest arguments that vegetarians can bring in support of their cause. As the world grows more populous fruits and vegetables must supply the larger portion of the food of its inhabitants. Not until men became versed in the art of agriculture was it possible to make further advance in cookery, since the products of the vegetable kingdom required greater development before they offered much inducement for the experiments of the cook. Nor do the most skilful efforts of the farmer avail unless the cook handles his products with equal intelligence.

Count Rumford once said, "The number of inhabitants that can be supported in a country depends as much upon the art of cookery as upon that of agriculture: both arts belong to civilization; savages understand neither of them."

Progress in both these arts is shown by the very general interest in cookery displayed by various agricultural organizations. They are recognizing that the quality of food product is not assured when it leaves the hands of the farmer, and that quite as much depends upon its preparation for the table as upon its cultivation.

Among the topics discussed recently by the grangers have been such as "The Garden of the Farmer *versus* the Pork Barrel." Another worth considering would be "The Home Garden *versus* Patent Medicine."

A census of New England today would fail to show a very general knowledge of the almost infinite variety of vegetables which might be cultivated within its borders.

It has been said that vegetables, to the early settlers of New England, meant only potatoes and beans and corn, with a boiled dinner now and then. That was a slight advance upon the habits of the Indians, but to their instruction we are indebted for much of our knowledge of corn and beans.

This ignorance of valuable foods is the result of habit and the inertia which makes it hard to enter new paths. The reason often given is that people generally do not like vegetables; perhaps it would be nearer the truth to say that we do not know how to cook them so that they will be palatable.

Not only have we failed to learn how to use new vegetables, but have nearly lost the art of making some of the standard dishes of the past. The increased facilities for obtaining meat from the West, and the cheapness of canned foods packed in California and the South, have rendered it unnecessary for us to exercise our ingenuity to prepare a variety of palatable dishes from the scanty store of products available to our ancestors. From the corn they prepared hasty pudding, hulled corn, brown bread, boiled and baked puddings, and succotash with the bean, which also furnished the bean porridge and filled the bean-pot, to be baked till tender and savory. Sauerkraut found a foothold in some sections of New England with early German settlers and remains until this day, and pickles of all sorts and kinds have always flourished. As a whole New Englanders have not taken kindly to soups and salads, and have yet to learn the possibilities of vegetables in these directions.

The early New England housekeepers achieved wonders with

flour, the most refined food product at their command, but they did not try many experiments with vegetables; possibly because the men were too busy in subduing the new land to provide very satisfying gardens. Then as now the cook books gave comparatively little space to directions for the preparation of vegetable foods.

The criticism usually made upon the present food of the American people by those familiar with dietary standards and the customs of other countries is that we eat far too much meat. By a comparison of the foods of different nations and classes of society we should see that meat eating is not essential to strength, and that the very poor depend upon vegetable food because it is cheap. On the other hand many of the wealthy find in the expensive varieties of fruit and vegetables, like the mushroom, the globe artichoke, and the products of the hothouse, an opportunity to spend money lavishly and to gratify their æsthetic tastes.

For the majority of our people today vegetarianism is hardly practicable, but its adherents increase rather than decrease. While in many instances vegetable substances furnish more nutriment in proportion to the cost, they are less quickly digested and less completely assimilated than animal tissues. Now we are obliged to employ the animals as middlemen to transform the tough grasses into substances which can be digested by us. As our scientific knowledge increases, doubtless we shall find ways to prepare as food many substances now worthless.

Though the people of this age continue to be meat eaters, the quantity now consumed because of the abundance of meat in this country is far too large. The average diet would be improved by a greater use of vegetables. Animal food should not constitute more than one-fourth of the whole amount eaten.

There are objections to an exclusively vegetable diet, and no radical change should be made; but equal objections may be brought against the use of meat. Probably a larger bulk of vegetable food would be required to produce similar results, and the vital processes would move more slowly. On the other hand, some of our most troublesome diseases, like intemperance, cancer, and gout, are thought to have a direct connection with excessive meat eating.

B. W. Richardson has said: "Keep as near as ever you can to the first sources of supply, fruits and vegetables."

Allowing for occasional idiosyncrasies, people can eat anything, and habits in this direction are easily formed. We learn to like olives and mushrooms because the taste for them is a proper one; in the same way we may enjoy a variety of vegetables.

At the present day we are beginning to realize that a knowledge of the composition of each food is essential to its wise selection and preparation. Vegetables and fruits afford all the five necessary food principles, but the proportions are hardly satisfactory for a perfect diet. Fats and proteids need reënforcement, and this is accomplished by the use of butter, oil, eggs, and meats.

To generalize in describing the foods which come from our gardens, they contain water, starch, sugar, gum, pectin, fats, proteids, and mineral matters. The great amount of water — from seventy-five to ninety-five per cent — serves to supply in pleasant form our most essential food. The lack of water in the average diet has been called our "gravest dietetic error."

The carbohydrates — starch, sugar, and the like — are the most important solids in vegetables. The potato contains more starch than any other moist vegetable, and according to late government experiments this is more easily digested than many other starches. Sugar is too often lost by throwing away the water in which vegetables are cooked. Dextrin and dextrose are formed from starch in the maturing of fruits, and probably in some processes of cooking vegetables. Pectin, pectose, and gum are substances as yet little understood. Fats in our ordinary garden vegetables are in too minute quantities to be reckoned. The proteids are complex substances and are most prominent in the pulse family. They are less digestible than animal proteids; even a third may pass through the system undigested.

The mineral matters are valuable forms of phosphates, iron, and potash, in keeping the blood pure.

It is interesting to note the different parts of plants which are used for food — the roots, stems, leaves, and seeds. The latter are used mainly in the dry form, and absorb much water in preparation. This must be remembered when studying analyses of dried legumes and cereals.

The cellular structure of vegetables, which constitutes nearly half their bulk, is the chief barrier to their use and the great obstacle to be overcome by cookery. This material is closely

allied to starch and is variously subdivided as cellulose, woody fibre, and lignin. These cell-walls cannot be wholly separated from the nutritive substances which they contain. In moderate quantities cellulose may aid the process of digestion by giving the necessary bulk for the stomach to work upon, and thus afford a wholesome stimulus to intestinal contraction. The denser forms of woody fibre cannot be digested, and moreover hinder the process in other substances associated with it.

Plants growing rapidly with plenty of water and sunshine usually have less of this woody fibre, and it is the aim of the gardener to eliminate it as far as possible. The cook tries by higher temperature to soften this substance, and if boiling water could be raised to a point above 212° Fahr. it would be desirable.

By improved methods of cultivation the agriculturist has removed the acid flavors of the natural vegetables and has reduced the proportion of woody fibre, but he undoes much of his work by careless methods of delivery to the consumer.

Between the farmer and the marketman certain trade customs have grown up which are calculated to foster ignorance on the part of the consumer and against which the protests of intelligent housewives avail little. A large part of the vegetables displayed in our markets are overgrown, wilted, or carelessly prepared. Those which suffer most from this treatment are radishes, cucumbers, green peas, beans, corn, and summer squashes.

The public must be educated to appreciate quality rather than size; to recognize the facts that wilted southern vegetables never equal "natives" in flavor, and that gain in size usually means a corresponding loss of flavor.

Why should we have to lose the sweet nutty root of the celery because it is pierced with a nail? Why need asparagus waste its strength in producing several inches of stalk which must be thrown away? Why should not summer squashes and cucumbers be sold by weight as well as winter squashes?

The arithmetic of the market gardener is mysterious to the housekeeper — sometimes onions are sold by the pound; sometimes by the quart. Bunches may be three or four or eight or any number that suits the dealer's fancy. Marketmen say that women are becoming more interested in all these things, and a simplification of methods of sale would increase this interest.

The public is not wholly to blame for its ignorance in these

directions. The gardeners often grow different varieties for their own table from those they offer for sale, and the greengrocers apparently know no difference in qualities of different species of vegetable. One market handbook devotes fifty pages to describing meats and fish, while but ten pages are given to vegetables and fruits.

Easy transportation and culture under glass have served to take away our appetite, since when we can have anything at any time we do not care for it at all.

The forcing of vegetables out of season has confused the housekeeper unfamiliar with farm life. She does not know when anything is at its best and does not take advantage of an abundant market, but supplies herself with canned vegetables, which are always in season.

There should be a strong movement against the use of foreign substances in canned and dried vegetables and fruits. Salicylic acid, coloring matters, and sulphur may or may not have ill effects, but they surely cannot improve the quality or flavor of first-rate vegetables.

Dried fruit and vegetables would be more popular if specific directions had been given for their use. Few persons realize that long soaking and little cooking produce the best results. Perhaps all this instruction will have to be given by some enterprising seedsman, just as the food-product people show how to cook their wares.

The housekeeper knows little of the comparative merits of the vegetables in the market, and often is no wiser than the New Jersey family recently reported by the United States Department of Agriculture, where 14.8 per cent of the whole sum spent for food went for oranges and celery, which furnished but 1.4 per cent of the total full value.

To quote Count Rumford again: "I constantly found that the richness or quality of a soup depended more upon the proper choice of the ingredients and a proper management of the fire in the combination of these ingredients than upon the quantity of solid nutritious matter employed; much more upon the art and skill of the cook than upon the sums laid out in the market."

The methods of cookery applied to vegetables are similar to those used for meat, but must be adapted to the composition and condition of the individual specimen.

There is usually some one way best for each vegetable, but where one kind only is available it is necessary to serve it in a variety of ways. This perhaps explains why the average cook book gives more receipts for the potato than for all other vegetables. Almost any vegetable may appear by due combination with milk, butter, and eggs in soups, fritters, croquettes, souffles, or salads. Suitable utensils are essential; vegetables should not be cooked in iron kettles when any others are attainable; strainers, ricers, and presses are desirable.

Strong flavors frequently are due to careless preparation. Careful trimming and thorough washing are essential. Wilted vegetables are improved by soaking. Salad plants need especial care in washing to remove parasites as well as hellebore or Paris green.

By cutting in small portions the time of cooking may be hastened. In general, vegetables are to be put in soft water, freshly boiling, and kept at the boiling point until tender. If uncovered the color is better preserved and the odors are less pronounced. Salt should be added when the cooking is partly completed. Soda may be used legitimately in minute quantities to aid in softening the water.

As a rule, with all sweet, well-flavored vegetables the water should be allowed to evaporate at the end, instead of draining it off. By that means all the valuable qualities are preserved.

In one of the publications of the United States Department of Agriculture the difference in digestion of the same food cooked in various ways is thus stated: Whole peas soaked and cooked, 60 per cent digested; peas cooked a long time and strained, 82.5 per cent; pea flour cooked with milk, butter, and eggs, 92 per cent. This would seem to prove that the portion of vegetable food considered undigestible can be reduced by right methods of cooking. Why should not a meal or flour of peas and beans be obtainable in our general markets?

It is impossible to give the exact time for cooking any variety of vegetables, for every sample will differ. They are unpalatable when underdone and also at the other extreme.

Contrary to the usual impression vegetables may be warmed over if care is taken in the process.

But it is to the home garden that we must look for the real luxuries in the vegetable line — where they can be tended and

petted individually and gathered as required, each at its own perfection.

The best land is none too good for a garden. It should be near the house, where each member of the family can spend the odd minutes giving cultivation to the plants, and in turn receiving fresh air. More outdoor work for women would add immensely to the comfort of the family. The garden should be planted to fit the family as carefully as a library should be selected. Many a professional man, living in city suburbs, would save doctors' bills as well as grocers' bills by cultivation of a garden.

Can we wonder that it is impossible to work the city poor out into the country when all education is away from Mother Earth? Had Mayor Pingree started the potato gardens a generation ago matters might stand differently today. Some foreign countries have found it wise to teach horticulture in their public schools. It is not strange that country boys and girls come to the city, since they are not shown the interesting phases of country life. Why do not the horticultural societies offer generous premiums for the best lot of vegetables raised by boys and girls?

What has the future for us in the supply of garden products? More progress than has been made in the past. By irrigation, electricity, and new devices, methods of agriculture will reach greater perfection. New districts in New England even may become as famous for some specialties as Kalamazoo for its celery, Boston for lettuce, and Essex County for onions.

New England is becoming a resort for summer travellers, and change of food is as necessary as change of air. Let the boarding houses refrain from imitating the city hotels, and make a specialty of fresh fruits and vegetables raised in the immediate vicinity, and the better class of company will appreciate their efforts.

Professor Goodale said awhile ago that as yet hardly one per cent of the plants known to exist are used as food. When we think of the unpromising condition of the natural potato and celery, here is an attractive field for experiment. Moreover, we have not quite succeeded in supplying all the needs of our own people when we import Scotch potatoes, Danish cabbages, and Hungarian beans.

The medicinal qualities of vegetables are known but little — they vary according to the soil and method of cooking and serving. A

tithe of the money now expended on patent medicines, spent in experiments would determine these qualities. Celery, some physicians say, has an undeserved reputation for relieving rheumatism; lettuce is supposed to quiet the nerves; spinach the French call the broom of the stomach; but who knows whether these claims are valid?

It has been worth while to study fermentation thoroughly because an immense amount of capital is invested in breweries. Cattle foods are investigated because they are a large expense to the farmers. Might not equal profit accrue from a thorough study of changes which take place in vegetable foods between the garden and the table?

So far as the nutritive value of the food is concerned, all efforts of horticulturists are useless unless these products are treated properly in the kitchen.

One of our New England agricultural reports recently contained many photographs showing the effect of different fertilizing agents on common crops. Why should not our agricultural experiment stations study different methods of cooking these foods, and tell us when and how to use soda and acids to soften the tough fibres of vegetables; when cold water is best and the effect of different degrees of temperature; how to treat the same vegetable at different stages of its growth; whether anything is gained from the action of diastase by soaking seeds before cooking; and a thousand other questions which perplex the cooks?

You may say these are questions for the cook to settle, but the farmer has an agricultural experiment station in each State with skilled chemists and biologists, and all the apparatus needed for such experiments. Why should they not do a little for the cook? The government holds schools and institutes for the teacher and for the farmer, why not for the housekeeper? Why is there not a chair of domestic science in all our New England agricultural colleges as well as in the West? Why should not the fairs offer premiums for cooked vegetables, or give lessons in this branch of cookery?

"The present need in this country is not so much of instruction how to earn as how to spend an income, especially a small one."[1]

[1] Edward Atkinson.

Discussion.

A lady asked, Did you say that no member of the cabbage family is poisonous? If so, how about the skunk cabbage?

Miss Barrows answered that that plant is not botanically related to the cabbage of our gardens, but belongs to the Arum family, and is closely related to the Jack-in-the-Pulpit.

In answer to another lady, who inquired about books, Miss Barrows said there are several that are helpful, but we need more. W. Mattieu's "Chemistry of Cookery" and Yeo's "Food in Health and Disease," which was quoted this morning, are among the best. She was convinced that writers on cookery do not know as much about vegetables as about meats. She would discourage the use of canned vegetables when fresh ones can be procured. There are all kinds and conditions of onions in the market. There is, as a result, a great difference in the time required for cooking and in the flavor; she advised changing the water occasionally. In reply to an inquiry whether young milkweeds are good for greens she said that they are, as also purslane and mustard.

President Appleton said he thought this was a field for ladies to work upon, and he would like to see a list of the plants which might be used. We want more definite knowledge of the changes undergone in vegetable substances in cooking.

Miss Barrows said asparagus beds are few and far between in farming communities. Swiss chard is seen occasionally in Boston markets.

Benjamin W. Putnam had grown Swiss chard in his garden; it will suit those who argue that we should eat only what grows above ground. A single plant will furnish enough for a family. It is our business as market gardeners to furnish what the public want. Prizetaker onions are said to weigh three or four pounds each.

Miss Barrows replied that the onions raised here are generally reputed coarse, and stronger than those from milder climates. Our cooks want an onion that will cook quickly.

Vice-President Ware thought the Danvers onion the most productive and having the best keeping qualities, but that it is not a desirable table onion. If one wishes to grow onions in a garden for his own use he should raise the Cracker onion.

Mrs. Lincoln asked why we should have nails in celery?

A celery grower stated that all that have gone from his place lately have been tied with matting instead of being nailed.

President Appleton said we want to do all we can to raise the standard of quality. We want to keep out the Bermuda onion by raising as good ones here.

Vice-President Ware wanted to emphasize the importance of the home garden. He undertook to say that if they do justice to the garden, the farmer and market gardener can supply better food for their families than any one else. For sweet corn and green peas, do not rely on one planting; plant every ten days. It is your duty to provide for your families.

Miss Barrows said the discussion on onions had brought out the point she made, that market gardeners do not raise the finest kinds.

Miss Bedford, of New York, was quoted as having a lecture on the neglected vegetables.

A gentleman mentioned using hogbrake, leaves of dog-tooth violets, and *Clintonia borealis*. Another said that more Egyptian onions are brought here than Bermudas, etc.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 13, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President CHARLES H. B. BRECK in the chair.

The following paper was read by the author:

HORTICULTURE IN CANADA.

By Professor WILLIAM SAUNDERS, LL.D., Director of the Dominion Experimental Farm, Ottawa, Canada.

The subject which I have the privilege of bringing before you on this occasion is that of Horticulture in Canada, and in the discussion of this topic it is my purpose to treat of horticulture in its widest sense, as embracing the art and science of the cultivation of trees, shrubs, and plants for both utilitarian and decorative

purposes. This subject covers so wide a field that the brief period of an hour will admit of touching on but a few of its more important features, and, with the view of presenting these in a clear and intelligent manner, I shall first give you a very short sketch of the country whose horticultural progress I am expected to outline.

The Dominion of Canada consists of seven provinces, four provisional territories, and a vast area to the north, much of which is yet unexplored. If the traveller through this country takes the train at its eastern boundary, at Halifax on the broad Atlantic, he may ride with one change of cars through to the shores of the Pacific, covering a distance of three thousand six hundred and sixty-two miles, and all within the settled area of Canada. The three most easterly provinces form a group partly surrounded and more or less intersected by the ocean, known as the Maritime Provinces. Following these come the goodly provinces of Quebec and Ontario, the latter stretching westward along the margins of the Great Lakes — Ontario, Erie, Huron, and Superior — until its western boundary is found beyond the Lake of the Woods. Here Ontario joins the "prairie province" of Manitoba, west of which lie the four gigantic provisional territories, — Assiniboia, Saskatchewan, Alberta, and Athabasca, — comprising vast plains. In a part of the territories a wide belt of the country, lying north of the 49th parallel, — which forms the boundary line between the United States and Canada, — has a dry climate, caused by the hot winds which blow northward from the great American desert. But beyond the spent force of these hot currents, beginning from one hundred and twenty-five to one hundred and seventy-five miles north of the boundary, we find immense partly wooded areas, watered by streams flowing northward, with a soil wonderfully rich and fertile and with conditions favorable for mixed farming, especially for the raising of cattle and for dairying. Still further west stands British Columbia with its sea of mountains enclosing an area abounding in minerals, coal, and lumber. Its waters teem with fish, and some of the fertile valleys are being fast converted into smiling fields of grain and prolific orchards.

Let us touch briefly on the conditions found in each of the divisions of this your neighboring country, and note the indications of horticultural progress. Prince Edward Island, the

smallest of the provinces of Canada, has an area of two thousand one hundred and thirty-three square miles, is one hundred and fifty miles long and varies from nine to thirty miles in width, and has a population of one hundred and ten thousand. This island has a fertile soil; the climate is cool and bracing in summer, but rather severe in winter. Many varieties of apples, plums, and cherries succeed well there, and gooseberries, currants, and other small fruits are produced in abundance; but the winter season is too severe to admit of growing the more tender fruits successfully. The cultivation of flowers is very general, especially in the cities and towns, in which many avenues of stately trees are found, most of which are European. So also are the shrubs which decorate the grounds about rural and city homes. The number of varieties of trees grown are few, and in shrubs one notices the absence of many beautiful forms which are grown very successfully in other provinces, and which will, no doubt, when introduced, do well here. Horticulture is encouraged by the holding of exhibitions of fruits and flowers in the capital at Charlottetown and elsewhere, which are assisted by grants from the provincial treasury. There is a fine park in Charlottetown, comprising about one hundred and fifty acres, with beautiful drives through the wooded areas and along the seashore, — a cool and delightful place of resort for the citizens throughout the summer months.

Across the Northumberland Straits from Charlottetown, some thirty miles distant, lies the Province of Nova Scotia, with its twenty thousand five hundred and fifty square miles of area and a population of four hundred and fifty-one thousand. The climate of the eastern part of this province is mild and well adapted for the growing of many varieties of fruit of high quality and in great perfection. The Annapolis valley, so well known as the scene of Longfellow's beautiful and tragic poem, is specially adapted by climate and situation for fruit growing, and is rapidly being converted into a vast orchard where the choicest sorts of apples, pears, plums, and cherries grow in the greatest abundance. In this valley there is a special school of horticulture, receiving a liberal provincial grant, where practical training is given to students in the propagation and growth of fruits, ornamental shrubs, trees, and flowers. To drive among the beautiful scenes in that charming valley, when the trees are

covered with blossoms in the spring, or when their branches are pendant with golden fruit in the autumn, is a delight not soon to be forgotten. There are many other localities in Nova Scotia where fruit culture is carried on very successfully, and the exports of fruit from this province are large and constantly increasing. The Fruit Growers' Association of Nova Scotia, which is also aided by provincial funds, is a strong and active organization, holding meetings at intervals during the year for the discussion of subjects relating to fruit growing and other branches of horticulture, and the information brought out is published in the proceedings of the Association. During the past year the quantity of apples exported was about five hundred thousand barrels. Some of this fruit, I am told, finds its way to Boston, where the high-flavored Gravensteins are said to be much appreciated; but much the larger portion finds a ready market in the larger cities in Great Britain. In Halifax there are several parks, including in all about two hundred and eighty acres. The Public Gardens, containing about sixteen acres, are also very attractive and contain some excellent specimens of trees, mostly European, and many varieties of shrubs and conifers, including some choice specimens of Japanese Retinosporas, notably of *Chamæcypàris plumosa* and *C. plumosa aurea.* The Scotch heather, *Calluna vulgaris,* also luxuriates here, and some of the fine flower beds are margined with this pretty plant, which has become naturalized and is growing in large patches in the public parks. Truro and other smaller cities and towns west of Halifax are emulating the capital in the establishment of parks, adorning their streets with avenues of trees, and embellishing their homes with groups of choice shrubs and beds of flowers.

In New Brunswick, with an area of twenty-eight thousand square miles and a population of three hundred and twenty-one thousand, the climate is not so favorable for general progress in horticulture as in the sister province of Nova Scotia. While orchards have been successfully established in the valley of the St. John river, the varieties of fruit grown are chiefly of the hardier sorts, and the cultivation of large fruits is not general. Small fruits, however, are grown in abundance, and the cool weather in early summer retards the ripening season and permits of the growing of large quantities of luscious strawberries, which,

ripening after the main supplies in the New England States, find a ready market in Boston and other cities, with but little competition and at good prices.

Recently a public park comprising two hundred and forty acres has been established at the city of St. John, occupying a commanding position overlooking the turbulent waters of the Bay of Fundy. Through this park roads are being laid out amidst charming and, in some places, rugged scenery. This must in time become a most attractive place of resort.

The Province of Quebec, with an area of two hundred and twenty-seven thousand square miles and a population of about one and one-half million, is also making progress in horticulture. In the valley of the St. Lawrence there are many fine orchards, and nowhere does the celebrated Fameuse apple reach so high a degree of perfection as on the Island of Montreal, where many varieties of pears also, and plums of fine flavor, thrive well. In the eastern townships, on the south side of the river St. Lawrence, fruit growing is carried on to a considerable extent and quantities of apples from this territory find their way to Montreal or are shipped to foreign markets; but on the interior lands, on the north side of the river, only the hardier fruits succeed, and the orchards are few and small. In Montreal and other cities and towns in this province, much taste is displayed in the laying out of the public parks and squares, and in the ornamentation of the grounds of the more wealthy members of the community. Horticultural societies and a Provincial Fruit Growers' Association have been organized, which are aided by provincial funds; annual exhibitions are held, and thus the love for the cultivation of fruits and flowers is fostered.

Ontario is the banner province of the Dominion, and its wonderful variety of climate and rich horticultural possibilities are as yet but partially known. With the noble area of two hundred and twenty thousand square miles, and a population of two million one hundred and fifteen thousand, this province has twelve and a half million acres of cleared land, about three hundred and twenty thousand acres of which are under orchard, garden, and vineyard. The number of apple trees of bearing age in this province is about six millions, while there are three and a half millions more of younger trees, most of which will soon be in bearing condition. The yield of apples in 1896 was

very large, and is estimated at fifty-six million bushels. In the Niagara peninsula, and along the shores of the western part of Lake Erie, peaches are grown very successfully, and there are said to be over half a million of peach trees planted in that part of Canada. Grapes, also, are grown in immense quantities. There are about three million of bearing grape vines in Ontario, producing annually about fifteen million pounds of grapes. There are also large orchards of pears, plums, and cherries, so that Canadian markets are well supplied with home-grown fruits of excellent quality throughout the season, and a large quantity of apples is exported to Great Britain. During the past year more than two million barrels were exported from Montreal. Ontario also sends large supplies of fruit to the prairie districts in the west. A thriving organization, known as the Fruit Growers' Association of Ontario, has been in existence for the past twenty-eight years, and has done much to stimulate fruit growing throughout the province, and also to cultivate a taste for ornamental trees, shrubs, and flowers. This Association receives a liberal annual grant from the provincial funds. The large display of fruit and flowers at the leading annual exhibitions helps to draw further attention to these interesting and important subjects. The Ontario government also gives annual grants towards the support of horticultural societies, which are established in most of the towns and cities of the province. Under this stimulus, frequent floral exhibitions have been held, and the people have been led to vie with each other in beautifying their homes by the planting of trees and flowers. Many large floral establishments are well supported by lovers of flowers. In the cities and larger towns public parks have been established, valuable not only as health resorts, but as repositories for some of nature's choicest arboreal gifts.[1] Horticulture also forms an important part in the curriculum of the Ontario College of Agriculture, which is located at Guelph.

Adjoining Ontario at its western extremity is the Province of Manitoba, with sixty-four thousand square miles of territory and a population of one hundred and fifty-two thousand. Here the climatic conditions are too severe to admit of the rapid extension

[1] The lecture was illustrated with lantern slides, showing scenes in the public parks and gardens in the different cities in the Dominion; also views of many beautiful individual specimens of ornamental trees and shrubs grown on the experimental farms.

of horticulture. The larger fruits are not successfully grown, but many of the small fruits are produced in abundance. The people are everywhere fond of flowers, and the long days and abundance of sunshine in the summer months give a wealth of bloom to many annuals and hardy perennials unknown in eastern climates.

Westward of Manitoba lie the four organized territories of the Canadian Northwest — Assiniboia, with an area of eighty-eight thousand square miles; Saskatchewan, one hundred and one thousand; Alberta, one hundred and five thousand; and Athabasca, one hundred and three thousand. These great divisions extend from the western boundary of Manitoba to the Rocky Mountains, are partly traversed by railways, which have opened up the country for settlement, and a sparse population of from fifty thousand to sixty thousand people is scattered here and there throughout this very large area. The love of trees, shrubs, and flowers is universal on the plains, and luxuriant gardens full of bloom are frequently found among the settlers. In the country to the north lie the unsurveyed and but partly explored districts, occupied only, as yet, by widely distant trading posts and occasional settlers, but mainly in possession of Indians and fur-traders. In this wide expanse are included the districts of Ungava, Keewatin, Franklin, Mackenzie, and Yukon, comprising in all about a million and a half square miles, exclusive of the water areas.

The most westerly province, British Columbia, includes three hundred and eighty-two thousand square miles and has a population of about one hundred and twenty-five thousand. In the busy mining districts not much attention is paid to horticulture, but west of the Coast Range of mountains, where the climate is mild and genial, much like that of England, fruits and flowers grow in profusion. There the holly, laurel, rhododendron, and yew flourish with the apple, pear, plum, and cherry, and, in some localities, the peach. In those parts of the province between the Coast Range and the Rockies there are many fine valleys, some of which have not sufficient rainfall to admit of the successful cultivation either of grain or fruit without irrigation. There are, however, many mountain streams available for this purpose and on some of the ranches very fine apples are grown. The taste for flowers is almost universal, and the long, mild season permits of

many of them being grown in perfection. This province has also a Fruit Growers' Association, assisted by a grant from the public purse, and exhibitions of fruits and flowers are held annually in the larger towns and cities. Vancouver and Victoria have both very fine public parks.

The progress of horticulture, as well as agriculture, throughout Canada has been greatly stimulated by the organization and maintenance of experimental farms by the Dominion Government. Ten years ago this good work was begun, and while the greater attention has been given to measures looking towards the improvement of farming, many lines of horticultural work have been vigorously prosecuted. These experimental farms are five in number, the central or principal farm being located at Ottawa, the seat of government, — where, on the boundary line between Ontario and Quebec, it serves the purposes of these two important provinces, — and the four branch farms in the more distant provinces of the Dominion. A site was chosen for one of these at Nappan, in Nova Scotia, near the dividing line between that Province and New Brunswick, where it ministers to the needs of the three Maritime Provinces. One was located near Brandon, in the central part of Manitoba. A third was placed at Indian Head, a small town on the Canadian Pacific Railway, in Assiniboia, one of the Northwest Territories; and the fourth at Agassiz, in the coast climate of British Columbia. The climatic conditions prevailing at these several points are all very different, and each location in this respect fairly represents a large area.

At each of these farms, orchards and fruit plantations have been established and a large number of varieties of fruits tested, while similar experimental work has been carried on with many different sorts of ornamental trees, shrubs, and flowers. The selections made in each case have been of such varieties as were thought to be most likely to succeed in the climates in which they were to be tried. In the Maritime Provinces the climate resembles that of many parts of New England, and the branch experimental farm at Nappan occupies a fairly representative position. The climate is milder and more moist than that of Ottawa, and all the varieties of trees and shrubs which succeed at the central farm do quite as well, or better, at Nappan, and many varieties of fruits which thrive in Nova Scotia are not able to endure the more severe winters at Ottawa. At this eastern branch farm

there are now nearly four hundred varieties of large and small fruits under trial and about three hundred varieties of ornamental trees and shrubs, and most of these are making satisfactory growth. Many additions are made to these lists every year. Already these plantations are proving a useful guide to the people in the Maritime Provinces, whether they desire to grow fruit or to beautify their homes by ornamental planting.

Passing now at one bound over a distance of seven hundred and forty-two miles west of Nappan, we find ourselves at Ottawa, the capital. Three miles from the centre of the city lies the central experimental farm, consisting of four hundred and sixty-five acres. Ten years ago this land was liberally sprinkled with stumps and stones, and encumbered with one hundred and forty acres of second-growth timber and forty acres of swamp. This has all been cleared and reclaimed, and brought into a fair condition of cultivation. About three hundred and thirty acres are devoted to agricultural work, thirty-five acres to the testing of fruits and vegetables, twenty-one acres to experiments with forest trees, nine acres to ornamental planting along the margins of the roads and about the buildings, and sixty-five acres to an arboretum and botanic garden.

There is an office building with chemical laboratory below, and overhead a museum of farm products, in which the fruits grown at the several farms make a striking display. Near by are the houses of the chemist, botanist, and horticulturist, about which there are some pretty groups of trees and shrubs.

The conservatory consists of two glass structures, each seventy-five feet long, in one of which there is a fair collection of economic and ornamental plants. In the list of the former will be found tea, coffee, cinnamon, camphor, pepper, cinchona, cocoa and other plants serviceable to man. There are also collections of orchids and cacti, with palms and ferns and many of the commoner house plants. Another house is used, during the early months of the year, for testing the vitality of seed grain for farmers and for general propagating purposes.

The barn with adjacent planting shows that the surroundings of even a barn may be made attractive by a judicious use of trees and shrubs.

Orchards have been planted and are used for testing fruits, and the number of varieties of large fruits under trial here is about

eight hundred, and of small fruits about as many more. Many new varieties have been produced on the farm, by growing large numbers of seedlings of choice sorts and selecting the best, and by cross-fertilization. Comparative tests have also been made of a large number of vegetables.

A useful adjunct to the horticultural department is the apiary, where the busy bees work all the summer day, gathering stores of honey from the flowers of various plants and trees, and in carrying on their regular work render valued assistance in fertilizing the blossoms of fruits.

Some people object to planting trees, fearing they may not live long enough to realize much enjoyment from them.[1] To produce the best results comparatively small specimens should be selected. A young and thrifty tree accommodates itself to change of location much more readily than an older one, and the young tree usually develops its normal form more perfectly.

During the early years of our work collections of bulbs — including lilies, hyacinths, narcissus, and many other sorts — were planted in the autumn; but the ground being open and without shelter, the snow at times was so blown off the ground as to leave it nearly bare and most of the bulbs were killed during the winter. To provide shelter, and collect and retain snow over them, an enclosure hedged with arbor vitæ and Norway spruce was planned and the bulbs planted within it; since then nearly all have wintered well. During the winter the enclosure and its surroundings are protected by snow, which gathers within and about it to a considerable depth. The evergreen margin is now about three and a half feet high, and portions of it are almost covered with snow during the colder part of the season.

The beds outside this enclosure afford different aspects, which make them very suitable for certain classes of plants.

Within, a constant succession of bloom during the summer is maintained: hyacinths, tulips, and other bulbs in the spring, and later fine masses of lilies, herbaceous peonies, and irises are grown.

The lilacs, when in bloom in the spring, are among the most beautiful of shrubs, and what delightful improvements have of late been made in this old-fashioned favorite! More than sixty

[1] Views were shown to demonstrate the development in growth and beauty which can be made in a brief period of seven or eight years.

varieties are under test at Ottawa, and nearly all are doing well. Charles the Tenth is one of the best; it is very rich in color, a wonderfully free bloomer, and the clusters of flowers are large. Alba grandiflora is also a good variety; its large white flower clusters contrasting with the rich deep green foliage make it very attractive.

A group of Scotch Pines, *Pinus sylvestris*, is a prominent feature in one part of the grounds; this was planted eight years ago. The trees were then eighteen inches high; now they measure from thirteen to fourteen feet. The rich green color of this species, which is well preserved throughout the winter, makes this tree an attractive object at all seasons of the year.

The Rocky Mountain Blue Spruce, *Picea pungens*, is one of the most valuable introductions of late years, and ranks among the most beautiful of hardy evergreens. The foliage in some specimens assumes a rich shade of steely blue, most striking in the early part of the summer. Many of these trees have been planted in different exposures on the central farm, during the past seven years, and all have proved perfectly hardy.

The European Mountain Ash, or Rowan Tree, *Pyrus Aucuparia*, is a fine object on the lawn when well-grown and clothed with branches to near the ground. Its beautiful foliage and abundant clusters of white blossoms in the spring, succeeded by bunches of scarlet berries in the autumn, make it attractive all through the season.

The Katsura Tree, *Cercidiphyllum Japonicum*, from northern Japan, is an interesting tree, which is quite hardy at Ottawa. The unique character of its foliage as well as its handsome form render it most desirable.

The Sweet Chestuut, *Castanea sativa* var. *Americana*, is a native of the western part of Ontario and is grown with some difficulty in the climate of Ottawa. After several failures, two or three trees have now become established and are doing well. One of these blossomed last spring.

The variegated Dogwood, *Cornus mas* var. *variegata*, is one of the most beautiful shrubs at all seasons of the year. The foliage is richly variegated with white and the variegation is well maintained throughout the season.

When speaking of the divisions made of the land at the central farm and the purposes to which the several portions

were devoted, I stated that sixty-five acres had been set aside for an arboretum and botanic garden devoted to the testing of trees, shrubs, and plants from all parts of the world. Work was begun in this branch six years ago, and already nearly two thousand species and varieties of trees and shrubs, and about one thousand of herbaceous perennials, have been brought together from all the northern sections of the globe and are being tested as to their suitability for the climate of Ottawa. Canada was for a long time the only important British colony without a botanic garden. This stigma has now been removed, and it is hoped that this institution at the farm will soon reach that stage of advancement which will make it a credit to the country.

Permit me to direct your attention for a short time to a few of the individual specimens on this part of the grounds:

The European Larch, *Larix Europea*, is a very handsome tree, valuable for its timber. It is a rapid grower and has a most graceful drooping habit.

The Golden Arbor Vitæ is a beautiful form of the common Arbor Vitæ, *Thuya occidentalis*, in which the foliage assumes a golden yellow hue. This is a brilliant object for a lawn and makes a beautiful hedge.

The Pyramidal Arbor Vitæ is another interesting form of the same species, quite pillar-like in its growth.

The Austrian Pine, *Pinus Austriaca*, is a stately evergreen, of fine form and habit, very hardy, and a fairly vigorous grower. A tree in the Arboretum which when planted six years ago was eighteen inches high now stands about seven feet.

The Norway or Red Pine, *Pinus resinosa*, has also a stately habit, but is of softer outline than the Austrian Pine and makes a handsome tree.

The Mountain Pine, *Pinus Montana*, is a very desirable object for a lawn. Its low-growing, bushy habit, with branches close to the ground, makes it well adapted for localities where space is limited.

The Tartarian or Bush Honeysuckle is a free-flowering shrub and one of the earliest to bloom in the spring, and when covered with its pink or white flowers, or later with its bright-colored berries, is very pretty.

Van Houtte's Spiræa, *Spiræa Van Houttei*, is a lovely shrub, which, during the latter part of May and early in June, is

literally covered with masses of white bloom. In growth it has a pendulous habit and is very graceful in form.

Spiræa Bumalda is another species of the same genus, which has an upright form. This is also a free bloomer and is very attractive.

The Weigelas are very beautiful shrubs which are not entirely hardy at Ottawa, the new wood being usually killed back more or less by the severe weather in winter. In most instances, however, a sufficient quantity of the wood survives to give a considerable amount of bloom. Siebold's Variegated Weigela has proved one of the hardiest forms at the central farm. It blooms abundantly in its season, and its variegated foliage makes it at all times very attractive.

The different species and varieties of Philadelphus (known also as Syringa and Mock Orange) are charming objects for the flower border, and quite hardy. The flowers vary in size from one to two inches across; some of them are single and some double; most of the varieties are richly perfumed.

The Snowball, *Viburnum opulus* var. *sterilis*, is an old-fashioned, but most desirable species for the shrubbery. During the blooming season it is literally covered with masses of snow-white bloom. *V. lantana* and *V. dentatum* are also very valuable hardy ornamental shrubs.

The Siberian Cornus, *Cornus alba* var. *Sibirica*, is another very useful and hardy sort. It is a pretty shrub when covered with its flat, white clusters of bloom in June; and when devoid of foliage during the winter, its brilliant red stems form a beautiful contrast with the white background of snow.

The Russian Olive, said to be a hardy form of *Elæagnus hortensis* var. *angustifolia*, is a small tree of very graceful habit, with foliage and branches of a charming silvery hue, which is best brought out where it has a background of dark green growth. This is a very hardy tree and endures the severe climate of the northwest plains well, and when in bloom its numerous small yellow flowers fill the air with their fragance.

Later in the season the Japanese Hydrangea, *Hydrangea paniculata* var. *grandiflora*, becomes a very prominent object in the collection of shrubs, from the large bunches of flowers so freely produced at the ends of the branches. This species has found its way into public favor very rapidly. Only twenty-three

years have passed since this shrub was first introduced from Japan, and during that comparatively brief period its merits have been universally recognized and it has become one of the most widely distributed and favorite shrubs in cultivation.

Populus Berolinensis is a Russian Poplar and one of the hardiest species tested. It endures the climate in all parts of Canada well, making a strong and rapid growth. Many thousand cuttings of this tree have been sent out from the experimental farms to settlers in different parts of the Canadian Northwest. These strike readily and soon form handsome trees, wind-breaks, or hedges. A specimen which was planted in the arboretum at Ottawa six years ago as a small tree now stands over twenty-five feet high.

Many inquiries are made every year as to the best sorts of shrubs or trees to plant for hedges. To gain experience and furnish object lessons, many different sorts are being tested for this purpose. Seventy-five varieties have already been planted as sample hedges, each fifty feet long, and a large proportion of them have had five or six years' growth. These are proving an attractive feature in connection with the ornamental planting at the central farm.

A journey of one thousand four hundred and thirty-seven miles west, by the Canadian Pacific Railway, brings us to the flourishing town of Brandon, in Manitoba, adjoining which is the experimental farm for that province. It is located partly in the valley of the Assiniboine river and partly on the heights above the bluffs which margin the valley. This farm has been greatly improved by the planting of trees, about sixty-five thousand of which have been put out in avenues, shelter belts, clumps, and hedges. Most of the hedges have been planted with quick-growing trees, such as poplars and willows, and enclose good-sized plots of ground. These hedges grow quite tall and act as wind-breaks during the summer and help to collect large banks of snow in the winter, which, on melting, leaves the ground in a very favorable condition of moisture. These plantations have placed examples before the settlers, which many have been induced to follow, and this incentive has produced gratifying results. Tree planting has been further stimulated by free distributions of tree seeds, large quantities of which have been collected, especially of the Box Elder, *Negundo aceroides*, and

the Green Ash, *Fraxinus viridis*. These seeds have been hitherto collected in the river valleys and ravines in the bluffs in Manitoba and the Territories, and during the past seven years more than five tons of such seeds have been distributed free by mail, and during the same period about six thousand packages of young forest trees and cuttings have been sent out in the same way to settlers in that country. Last year the native trees planted on the two western experimental farms produced seed freely, and more than a ton of this has been collected for distribution during the coming season. An arboretum has been started at Brandon, and there are more than one hundred species and varieties of trees and shrubs in it which have proved hardy, and many more are under test. A large number of varieties of flowers have also been tried. Nearly all the annuals do well, and the large amount of sunshine they enjoy there brings many of the species to a higher degree of perfection and results in a greater abundance of bloom than is usually found in the east. In perennials, the hardy list includes Tulips, Herbaceous Peonies, several species of Iris, Hemerocallis, Aquilegia, Aconite, Delphinium, and many others. The love of flowers among the people is very general, and many take great pride in their gardens.

While most of the hardier varieties of small fruits, such as raspberries, currants, and gooseberries, are grown with success, all attempts to grow the larger fruits produced in the east, such as apples, crab apples, pears, plums, and cherries, have failed; the trees do not endure the climate. There is, however, one small wild crab, *Pyrus baccata*, with a fruit about the size of a large cherry, which has been obtained from the northern part of Siberia, that has proved perfectly hardy, having stood four or five winters without showing any sign of winter killing. This bears fruit very freely, and notwithstanding their diminutive size these tiny apples make excellent jelly, and in their present unimproved state would be much appreciated. Efforts are, however, being made to improve this small crab by cross-fertilizing it with many of the hardiest sorts of apples. A large number of these cross-bred seedlings will be ready for planting on the northwest farms in another year. Suitable enclosures are being prepared which will afford the young trees some protection and within two or three years it is expected that some of these will bear fruit. Similar experiments have also been carried on with

Pyrus baccata prunifolia, which has also stood one winter in the northwest without injury, and this fruit is about double the size of that of *P. baccata*. It is probable that some of these cross-bred seedlings will bear fruit of larger size and improved quality, which will be valuable to the settlers there. These trees are both small and low-branched and well adapted to endure the climatic conditions prevailing in the prairie country.

The wild Plum, *Prunus Americana*, is found native in different parts of Manitoba and is common in the valley of the Assiniboine river and in the other river valleys in the southern part of that province. The fruit varies much in size, color, and quality, some trees producing red fruit and others yellow, and while some of the fruit is but slightly astringent and of fair quality, other samples are scarcely edible. Efforts are being made to improve the wild plum by selection from seedlings grown from the best varieties. It is proposed also to follow this up by cross-fertilizing with better sorts.

The Sand Cherry, *Prunus pumila*, is also a native of the far west. It is common about the Lake of the Woods and has been found on the prairies as far west as the 108th meridian, and as far north as Prince Albert, which is about three hundred miles north of the United States boundary. The Sand Cherry is a very variable fruit; the commoner forms are about the size of a large Marrowfat Pea, with a disproportionately large stone and astringent flesh, while occasional bushes are found bearing fruit as large as the English Morello Cherry, with a much larger proportion of pulp to stone and a superior quality of flesh. Fruits subject to such free variations in the wild state may be expected to improve still more, in size and quality, under the influences attending higher cultivation and cross-fertilizing. It is believed that the prospects in connection with the efforts which are being made to improve the fruits referred to are hopeful, and that there will in time be produced such varieties as will prove useful fruits to the people of the northwest country.

A further journey of one hundred and eighty-five miles over the plains brings us to the experimental farm at Indian Head, in Assiniboia, one of the Northwest Territories. This farm is about the same size as that at Brandon, viz., six hundred and eighty acres. When this land was purchased it was a piece of bare prairie, without tree or bush. During the eight years it

has been occupied tree planting on a rather large scale has been carried on, and there are now growing on this farm, in shelter belts, blocks, avenues, wind-breaks, and hedges, more than one hundred thousand trees. Difficulties were encountered at first from the very strong winds, which gave the trees a stunted appearance, but these obstacles were gradually overcome and the trees have now made such a free growth that they protect one another, producing a vast improvement in the appearance of the place, and affording much shelter.

Although the climate is more severe here, the experiences had with fruit trees and with forest and ornamental trees, as well as with flowers, are nearly the same as those which have been gained at Brandon.

A further railway ride of five hundred and fifty miles from Indian Head brings us to the end of the one thousand miles of plains which stretch from the easterly part of Manitoba to the Rocky mountains, and now we find ourselves ascending among the foot-hills, the landscape broken into bluffs and valleys with clumps of wood and park-like openings between them, and after two or three hours more of journeying, Banff, where the Canadian government has established a national park, is reached. It nestles among the mountains, and the efforts to improve this beautiful spot have been mainly in the way of making roads so as to open up the romantic beauties of the place, and render those points which afford the most striking views easily accessible. As we approach this elegant resting place for tourists, we pass the "Three Sisters," a lovely group of mountains; also the Cascade mountain, whose bold rocky summit rises abruptly from near the railroad track more than five thousand feet above the valley. This mountain derives its name from a small cascade which dashes down the mountain side, in which it has worn a distinct channel. Some of the most lovely views to be had anywhere in the mountains are to be seen at Banff, where there is a delightful combination of mountain, water, and forest. A museum has been established here by the government, which contains collections of the mammals, birds, and plants found in the national park.

There are also some beautiful lakes in this neighborhood. Lake Louise is one of the prettiest. The bright green color of its waters contrasts strongly with the pure white of the glaciers beyond, while the many-hued cliffs, with various shades of brown

on the one side and the deep green of the spruce-clad banks on the other, all help to form a most harmonious and striking picture. Near by, but about a thousand feet higher, Lake Agnes bursts upon the view, with wilder and totally different surroundings.

One more stretch of about four hundred and eighty miles, through wonderfully varied mountain and valley scenery, takes us through to the valleys and delta lands of the coast line. Here we have the coast climate, which, on this part of the shore of the Pacific, is cool in summer and mild and moist in winter; but returning eastward towards the interior, it becomes hotter in summer and colder in winter, with less rain.

At Agassiz, seventy miles east of the ocean, the most westerly of the experimental farms is located, in the valley of the Fraser river. Seven years ago this place was a wilderness. Now there are one hundred and thirty acres of land cleared and under cultivation, and about half of it has been planted to fruit, and more than two thousand varieties of fruits are under test there, nearly all of which are doing well. The climate is mild, and suitable for this industry, and nowhere do the plum, apple, cherry, and pear bear fruit in greater profusion. Every variety likely to be of benefit to the country is being tested, so that the fullest information may be available to the settlers as to the best and most profitable varieties to plant.

All sorts of small fruits succeed remarkably well here. A very large number of ornamental trees and shrubs are also successfully grown, including some of the more tender varieties, which are not hardy at Ottawa. Flowers also succeed admirably in this moist climate. The Japanese and other lilies grow luxuriantly, and during the flowering season they fill the air with their fragrance.

I must not trespass further on your time. I have but touched here and there on the almost limitless field covered by my subject. I hope, however, that I have succeeded in showing that horticulture is not entirely neglected in Canada, but that individuals, communities, and governments (both Provincial and Dominion) from one end of the country to the other are striving to help along this good work. While we cannot expect soon to reach that degree of horticultural advancement which we see and admire so much in older and wealthier communities like

your own, we are striving to follow in a measure your noble example and to profit by the generous help which you are always ready to give. Your Arnold Arboretum has aided our experimental farm work in a princely manner, and your ever welcome publications are a constant stimulus towards progress. Although not under quite the same form of government, we are of the same stock as yourselves, and the love for and appreciation of the marvellous beauties of nature brings like pleasure wherever we dwell, whether we acknowledge as our ruler a worthy president or a matchless queen. Horticulture is bounded by no political lines, but in every community where the mind is sufficiently cultured to appreciate the wonderful beauties with which the world is studded, there these lovely trees and shrubs and flowers, which combine so much of grace and beauty, become a perennial source of quiet delight. They are but expressions of the thoughts of the great Creator, who established and sustains the laws which govern their growth and development. Some love for the beautiful in nature is found in almost every breast, and companionship with such charming objects tends to deepen and enlarge that feeling of admiration, to elevate our thoughts and lead them from Nature up to Nature's God. Their beauty is inspiring, and while we study them we catch the spirit and gladly follow the teaching of the great Master in his inimitable Sermon on the Mount, when, gazing on the lovely flowers growing around him, with the deepest insight into the perfection of their beauty, he exhorted his hearers to "Consider the lilies of the field how they grow. . . . I say unto you that even Solomon in all his glory was not arrayed like one of these."

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 20, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following paper was read by the author:

SOILS AND POTTING.

By T. D. HATFIELD, of Wellesley.

The subject which your Committee on Lectures has been kind enough to choose for me is generally considered by gardeners as the most important one they have to deal with. This is true, but we must not narrow the question down to one simply of gardeners' methods, for many of us are farmers as well, cultivating a great variety of plants, and we wish to consider whatever in this connection affects our material welfare.

Gardeners seldom fully agree about the proper soil for any crop. Few of us find ourselves having the same conditions of soil to deal with. Our soil may be heavy or light, the land high or low, and with every variation of exposure. We go from one place to another, and often wonder at our neighbor's success when we should consider failure certain. I have received plants with the soil so stiff that I wondered how they ever dried out when once wet; and from another place where the soil would appear to be about the same as our swamp mud. An acquaintance of mine tells me that at one place where he was gardener, in the neighborhood of Cape Ann, the only bit of potting soil he could find was turf from what had at some time been a salt marsh. After it was broken up, and the air and frost went through it, he found he could grow almost anything, from a geranium up to an azalea. Everybody finds a way of dealing with the problem before him.

Sometimes we find ourselves with a garden lot so springy that nothing can be done in the way of cultivating it until very late in the season, and again with a soil so dry that we must irrigate for all except early crops. A dry soil is easily worked, but more difficult to keep in condition for supporting crops, because it holds sustenance poorly. Frequent manuring is required to keep it in

trim. For general purposes, probably a heavy soil is best. It is easy to make a part of the land light enough for a few early crops. Then a heavy soil holds manures better. By autumn plowing and cultivating the ground in plats, one can bring it into a good friable condition. We all know the value of a retentive soil in summer time. These general remarks have some bearing on what I shall say later.

We gardeners, taken together, are a conservative lot. We believe in "leaving well enough alone." It is a good policy, and one which carries much weight with it, and respect also. There are methods which we continue, often because it is the custom or practice to do so, and often we cannot explain why. Much experience is scratched up in a hand to hand sort of way; we find out as we must, and often we are obliged to experiment for ourselves, for the best practice of one does not always suit the case of the other. The gardeners of the United States have to thank the old-country gardeners, and many of us our old-country training; though much that we do here is done differently, yet an intelligent training helps us better to gauge our practice to the altered conditions, and these are principally of climate. Wrong we may be sometimes, and often too particular, but it is better always to err on the side of prudence.

Take the old books, and we shall read: "One-third of turfy loam, one-third of leaf soil, and a third of sand;" or it may be fourths, including rotted manure, or fifths, with peat added; but accurate measuring is tedious work, and too slow to suit Yankee ideas, so the tendency is toward simpler methods. As a matter of fact there are but few mixtures of soil in use today. Leaf soil, one of the best ingredients in any compost, is seldom used in any except private gardens. Many gardeners manage to get along without it. Well rotted manure is a good substitute, and in some cases is better. It is necessary, however, owing to the prevailing slipshod methods, that the soil should be light for potted plants. The man with a hose can over water with safety when the weather is hot, and the plants soon dry out, and when it is cold artificial heat has the same effect. But you cannot persuade the old-time gardeners to use the hose, though they may see that it really makes little difference, if ordinary care is used. Many plants set down as requiring heavy soil may be grown as well in a light soil. Wherever the rose grower is located, he finds means

of meeting the natural wants of his soil. He may add clay, but will not if he finds he can succeed without it, and he is almost sure to do so.

Take Azaleas. It used to be, and is yet in some places, considered necessary to import English peat in order to be successful with them. Ninety per cent of these beautiful hard-wooded plants are still grown in peaty soil in England. Nothing succeeds like success there as well as here, even though it be arbitration! If an English gardenerg rows good Azaleas in peaty soil he is not likely to change his practice. Ocular demonstration cannot be overcome, and if we will not be convinced by any other argument we must be by this. For instance, take a look at the Azaleas grown by Mr. Charles Sanders, gardener for Professor C. S. Sargent, of Brookline, and you will see that Azaleas can be grown in a soil almost wholly lacking peat.

This brings us to another part of the subject. The successful cultivator of plants finds there are other considerations almost as important as the soil and its consistency. I have tried all kinds of soil for Gloxinias, consulting this and that formula. I potted them in light soil, heavy soil, rich and poor, all to little advantage. With these handsome tuberous-rooted plants much depends on caring for the tubers during what is called the resting season, though they are never absolutely at rest and we make a mistake when we enforce it by removing the tubers from the soil in which they have been growing and storing them in dry sand, as is frequently the practice. They should never become thoroughly dry, for living roots will at all times be found, and these require some nourishment. It is important that we should start with sound, healthy roots, start them slowly by withholding water until some leaf growth is made, and at all times keep them near the light, though not in direct sunlight. If we attend to these essential conditions we shall find that Gloxinias succeed in almost any soil. Peat soil may be necessary for some Ferns, but almost all of them will thrive as well in good loam and leaf soil.

It may surprise you to know that I have but one compost heap, and that is seldom as good as I should like to have it. Good turfy loam is not as plentiful as I could wish, and though it is really the best, some of us have found out how to get along without it. The old country carnation growers are extremely careful when mixing their potting soil — a barrow full of this and that

and so much brick rubbish and charcoal; but the American grower prepares his in the field without a foot of turf; he must and so he does. He has several methods and perhaps the best and most common-sense one is to cultivate the area for stripping, growing thereon a crop of clover with no object beyond turning the best of what is put into the soil as manure into plant food of the kind which the Carnation most needs. The American grower raises more and better Carnations than his English compeer. He has, it is true, many advantages not possessed by the Briton. He has better light during the winter time, he has made a specialty of the work, and more than all, he has originated a new type of Carnations. What I have said about Carnation growing only goes to show that the importance of a prescribed composition of the soil is over-estimated.

I said I had only one compost heap; this is not quite true, for beside it I have a special one for Chrysanthemums. Perhaps I am fussy in this, as I don't think it makes much difference. I am fond of experiments and have made lots of blunders in my time, but I can say this, that two plants potted in the soil from the common pile were just as good as those grown in special soil. The specimen Garza shown at the last exhibition here was one of these.

When I first set out to pile up potting soil I scratched hard for turf. I landed in New Jersey, and those who have lived in the manufacturing districts about New York know how scarce a bit of turf is. I was bound to have it, and so made up a pile of witch grass dug from the road-side. It was not very bad, for witch grass does not grow in poor soil. I was delighted, however, when I came to Massachusetts and the possibilities of a rare compost heap grew in my imagination, but I soon learned that turf here was not as free as water by any means. It is an old saying that "one never knows the worth of a thing until he wants to buy it." I was not to be baffled, however, and in less than a year I had half a dozen piles. I scoured the hollows in the woods for decayed leaf soil, and well remember coming across an old-time charcoal burner's camping ground in a clearing, well covered with turf. I thought I had now found just the right kind of soil for everything; but it proved to be the deadest stuff I ever used. Like a fancy dish it was no good without a dressing — a dressing of manure in this case. I made up my mind to keep my

find a secret and did until another was disappointed in the same way, and then, remembering that "misery loves company," I told how I had been deceived.

On a gentleman's place there is always a good deal of turf trimming to be done in spring time, grass edges to be neatly cut off around the walks, and borders straightened. By taking a generous slice where I dared, I usually managed to get together enough for the season's use. I am less ambitious now; if I get half a dozen cartloads of turf, I mix with it two loads of my best manure — sheep manure when I can get it. That which comes from the Colorado ranches is just right for composting, being three or four times as rich as other manures, and less is required on this account. This I put in layers alternately with pure ground bone. The bone meal and sheep manure will start fermentation, and this chemical action is valuable in more ways than one. Soil heated to 120 degrees Fahrenheit is fatal to all insect life and weed seeds, and further than this experience has shown that this chemical action is necessary to render bone meal available as a plant food. I have seen it used in a green state, but cannot say that I have been pleased with it; the odor is most disagreeable, and the mouldy condition it assumes, which is, no doubt, a necessary stage of its transition from a crude into a soluble plant food, is, to say the least, unpleasant to look upon. Bone meal is slow in becoming available, but lasting when it is; it should be worked into the compost long before it is needed, as it is not fit for use until fermentation has subsided. It should never be applied as a top dressing. Before I knew this I thought it would be a good idea to scatter a layer of bone meal on the bottom of flats I was working up for young Chrysanthemum plants. I intended they should have a good start and was, I suppose, too liberal, for in all my experience I never saw such a sickly looking lot of plants. I examined them every day and tried my best, hoping and believing they would come round. I waited almost too long. Finally I potted them in fresh soil, and when taken out of the bone meal compost I could almost have blown them over; how they managed to exist with so few roots is a mystery.

I said a light soil is best for potted plants, but this is only my experience; where a man must, perchance, get along with a heavy soil, and understands its management thoroughly, he may say as much in its favor. Two or three years ago my employer dug

out a slough; he wanted mud and also a place to dump gravel. This slough was found to be a depression in which for untold ages decayed leaves had gathered; the ground was spongy and too wet for general farming purposes. Little did we think to find black soil ten or twelve feet deep. It was piled up and valued only as swamp mud, but when it sweetened and vegetable life got a chance for possession we found that grass and whatever grew on it thrived luxuriantly, showing there was body in it. Though black in color it is light in weight and does not pack. I have grown Geraniums, Cinerarias, Chrysanthemums, Calceolarias, Cytisuses, Heaths, and Azaleas in it and all have done well. So it is; much must be gained by experience, and in no other occupation is one so much subject to his environment. All the functions of gardening go hand in hand; if we fail in one, we may fail in all. Injudicious watering of plants would lessen the value of the best compost; a lack of air and the requisite amount of heat and moisture would ruin the best plants.

To pot our plants properly is only part of the work; still "whatever is worth doing is worth doing well." Potting is like cooking a hare: "you must first catch your hare;" that is, see that you have clean pots and, if new, properly deodorized. Let me explain — gardeners know that plants seldom thrive in pots fresh from the kiln; exposure to the weathering influence of a rainstorm will sweeten them, or, lacking this, a good plan is to fill the new pots with moist earth and let it stay in them for a day or two; this earth should not be used. Next in importance to sweet, clean pots is good drainage. Crocks of broken pots are the best material to use. In healthy plants the bulk of the roots will be found among the drainage. Coal ashes are excellent for many plants, but they contain lime, and while this is a necessary ingredient in the food of some plants, it is not needed for all, and to some it is decidedly objectionable.

Plants which do the greater part of their growing during winter time, as well as those which remain a long time without repotting, require the greatest care. All potting should be done firmly and this for the most part can be done by the hand; it is seldom necessary to use the potting stick in order to pack the soil more firmly, and then only for large plants and such as have solid balls of earth, as Azaleas, Heaths, and other shrubby greenhouse plants of slow growth. I remember once hearing a story

of a youth fresh from school, about to begin his apprenticeship in a large place on the other side. He came into the potting shed, whittling a stick; on being asked what he was going to do with that, he replied he was going to pot orchids with it.

Plants which grow quickly, such as Geraniums, Heliotropes, Coleuses, Fuchsias, and what gardeners include under the general term of "soft-wooded plants," require less care; in fact, as spring advances and time becomes precious, quickly growing stock is potted with very little ceremony. A quick hand will pot several thousands of small plants in a day.

A common practice among amateurs is to put out their window plants for a summer's growth. It is often a surprise and also a pleasure to watch such plants make luxuriant growth in their natural elements — free and unrestricted root area with plenty of air and sunshine. Usually their growth is altogether out of proportion to the space they must occupy for the winter, and it seems as if they would require much larger pots. If, however, as is generally the case, the greater number are of the Zonale type of Pelargonium, or what we know as Geraniums, they will bear considerable hard treatment and may be roughly pruned in and much curtailed in amount of root room, and very likely will do as well as if more liberally treated. The same applies to almost all window plants. The disposition is to be far too generous with pot room. The conditions under which window plants must exist in living rooms are anything but congenial. I should prefer to dispense with my old stock after the summer's growth, having raised a lot of young stock in the meantime. The disposition to be generous is natural. It has always been regarded as "more blessed to give than to receive." One question the amateur is sure to ask is, "What fertilizer can I give my plants to start them up?" when all that is needed is better light and air, or more or less heat as the case may be. Artificial manures, no matter how attractively labelled, are sure to do more harm than good to window plants in winter time. If the plants are sick it will be owing to some other cause, and manures would only make them worse; it would be like trying to cure a dyspeptic with a course of high living.

A word or two on the use of artificial manures in the liquid form for potted plants may not be out of place here. It is intended by their use to increase growth and general productive-

ness whether it be fruits or flowers. More skill is required to continue a crop of flowers or fruits in productiveness after it has exhausted the natural resources of the soil than in bringing it to this condition; this is the mark of success with some men. It is not my intention here to name one manure above another; there are a dozen good ones, only some are safer to use than others. One of the simplest and best is the dregs from the barn-yard. They contain in a highly concentrated form nearly all the constituents of a complete plant food; but even this cannot be used unstintingly. Some experience and good judgment will be required to gauge properly the amount which may be safely used in proportion to clear water. It is well to start with a one-eighth strength and increase it as experience dictates. I have used dry Colorado sheep manure, at the rate of a peck to fifty gallons, and this is right to use without fining down. Sulphate of ammonia or nitrate of soda may be used at the rate of one pound to fifty gallons of water; these are really stimulants and not lasting manures. Their action is quick both of benefit as well as injury, and an overdose is a terrible trial for one to experience. These should only be used as alternatives. Some of us have used Albert's Horticultural Manure, which is an excellent article in the hands of a cautious person, but an overdose is awful. I am not skilled in mixing manures; but am satisfied to use one at a time. Liquid manures should be used only on plants making healthy growth, and the drainage must always be free. It is very seldom that sick plants will be benefited.

The sowing of seed, when the quantities are small and often precious, requires some special mention. Here again few gardeners are in accord. In giving my own methods I know I am likely to run counter to many experienced practitioners. Mr. Jackson Dawson, of the Arnold Arboretum, and an old fellow at the Harvard Botanic Garden, whose name I regret I never knew, could give many of us points on sowing seeds and raising seedlings; still some general rules may here be given.

Sixty degrees Fahrenheit is a good temperature in which to germinate seeds of tender plants coming from semi-tropical regions. Tropical plants require somewhere in the neighborhood of eighty degrees, while seeds of many hardy plants germinate well enough at sixty, but for some even this will be too high, especially for many kinds of clematis and all such as take a long

time to germinate; some will germinate in a temperature scarcely above freezing. A light sandy loam with some leaf soil, charcoal, and brick dust sifted together will suit all seeds. Boxes or pans may be used with crocks over the holes and coarse siftings laid above this and the boxes filled with the prepared soil to within half an inch of the top and pressed firmly, then mark out drills with the edge of a label or bit of wood and scatter the seeds along; vary the depth of the drill according to the size of the seeds. Very fine seeds need no drill and may be scattered upon the surface. A shaking will generally cover the seeds enough, and the surface should again be pressed firmly with a brick or something which will leave a smooth surface. With the exception of very coarse seed, I do not practise overhead watering, preferring the sub-irrigation plan of immersing the boxes or pans to the edge, letting the water in from below. Less frequent wetting will be required and most seedlings will be up before a second application is necessary. There are several ways of disposing of the seed pans until germination takes place. I usually put over them a piece of glass and a light shading of paper; but where space is limited I have set them away in tiers, so that the bottoms do not actually rest upon the tops of those below them, and find they do almost as well as when spread over more space. As fast as germination proceeds I expose the young plants to light and air. At this stage they require very careful watering, or the whole lot will damp off in a single night. Seedlings should be transplanted as soon as large enough to be handled conveniently.

In what I have said it has not been my intention to lay down any strict rules in regard to the use of soils and potting. I should be travelling on altogether too dangerous ground. I have preferred rather to deal with some general principles on which these operations are based.

Discussion.

The lecture was illustrated by examples in potting plants, rapid potting being shown by three Ageratums, while careful potting was illustrated by the Begonia.

The lecturer said that seedsmen should always state in their catalogues, especially with regard to new plants, whether they are from tropical, temperate, or cold regions.

A lady asked how to repot a Rubber Plant. Mr. Hatfield said that the example given would be just right; he would not cut off any roots, but he would like to see the plant first.

Thomas Harrison asked what the method of preparing bone meal was.

Mr. Hatfield replied, "Take half a dozen cart-loads of turf and three hundred pounds of bone meal. The value of bone meal is increased by fermentation, which process is accompanied by heat, and often destroys insects and weed seeds." He said he would not use bone meal on Geraniums.

Mrs. E. M. Gill said she used it, and that her Geraniums did well.

A stranger asked how much sheep manure would be used with six cart-loads of turf. Mr. Hatfield considered five to six hundred pounds enough.

George D. Moore said that he used bone meal liberally on Lettuce, and it prevented "dropping." He used bone meal which was as fine as flour, and gave it to Cucumbers as well as Lettuce; in two hills left without it the vines were a foot less in growth in a short time.

W. D. Hinds asked the difference between bone meal and bone flour. Mr. Moore answered that the bone flour is so fine that it has to be put in double bags.

A gentleman asked whether old potting soil can be used a second time.

Mr. Hatfield replied that he saves old potting soil when he thinks it good enough, and uses it for annuals, such as Asters, Zinnias, Stocks, and Verbenas.

President Appleton inquired if it did not make a difference whether it is thrown over and aerated.

Mr. Hatfield said that it did. Some soil is too good to throw away, and most any can be renovated by aerating and sweetening.

A Geranium was potted to illustrate how many roots may be taken off.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 27, 1897.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture was delivered on the John Lewis Russell Foundation:

THE SPREAD OF PLANT DISEASES — A CONSIDERATION OF SOME OF THE WAYS IN WHICH PARASITIC ORGANISMS ARE DISSEMINATED.

By Dr. ERWIN F. SMITH, Assistant Pathologist, Division of Vegetable Physiology and Pathology, United States Department of Agriculture, Washington, D.C.

The subject selected for this address is a rather large one for treatment in a single lecture. Parasitic diseases of plants are disseminated in a great variety of ways. I shall not try to cover the whole field. All I desire or expect to do at this time is to call your attention in a plain, straightforward way to certain well-known facts, and to others not so well known, drawing as I proceed certain inferences or conclusions which may be of use to you hereafter in your daily work. This lecture will necessarily be rather categorical, and not of much interest, I fear, except to those who are actually growing plants as a means of livelihood. I shall for the most part neglect the common and well-known dissemination of parasites by wind and water, and deal chiefly with methods of dissemination which are to a large extent within our control. "The wind bloweth where it listeth," and we cannot stop it, but there are certain dangers we may avoid, and some of these I will endeavor to point out. I wish particularly to show how farmers, fruit growers, florists, market gardeners, and all who have to do with the growing of plants are themselves not infrequently responsible for the spread of diseases, which either destroy their crops outright or leave the balance on the wrong side of the ledger. If I can make this one fact perfectly clear to you, your own reading and reflection will do the rest, and I shall not have cast my seed into stony places or by the wayside.

As you all know, our modern intensive cultivation of flowers, fruits, and vegetables for market purposes is beset with many

difficulties. To a transient visitor who strolls about, admiring the regularity, thrift, and fruitfulness of every plant in sight, it may seem an easy matter to grow violets, roses, or chrysanthemums; tomatoes, cauliflowers, or cucumbers; strawberries, grapes, or cherries, as the case may be. Certainly nothing seems easier, and just as certainly no business of life is beset with more difficulties, requires more constant attention, more good judgment, more knowledge derived from painful experience, or more thoughtful consideration of every least detail of the business. The transient visitor sees the brilliant successes; what he does not see is the long line of mingled successes and failures, the worries and disappointments, the long experience and sleepless care of years, which have led up to this fine consummation. If he thinks such results are born full-fledged out of Mother Earth, like Minerva from the brain of Jove, and that all one has to do is to plant seeds or set out cuttings and wait contentedly for the early and the later rains, let him try for himself. It is usually easy to find some pessimistic mortal with greenhouses and trucking grounds for sale, and he can begin at once, if so inclined, let us say, on cucumbers or tomatoes for the winter and early spring market. He has himself paid fifty cents a pound for tomatoes and ten cents apiece for cucumbers, and knows there is "big money" in it. Let us follow our optimistic friend for a time and see what happens. He starts in well and early the first season. He is up with the lark and overflowing with energy. Things must gee. He has the writings of Peter Henderson by heart and all he lacks is experience. Let us drop in some months later. The plants are not doing well; the crop has practically failed. What is the matter? The seeds were poor, and did not come up, or germinated slowly and irregularly, or the seedlings damped off in great numbers, necessitating a second sowing, which set the crop back and brought the product into an overflowing market with poor prices. Or the soil was not properly selected, and yielded only inferior plants and stunted fruits, in spite of all care and coaxing. Or, possibly, the crop may have started off well, but the gardener or other help did not understand firing or the management of ventilation, the plants being nearly roasted at times, in spite of the plentiful supply of expensive thermometers hung in all parts of the house, and then suddenly chilled with floods of cold air by way of compen-

sation. Or, finally, perhaps the chief trouble was in the use of water. The management of water in hothouses is a fine art. Nothing requires better judgment and in nothing is our friend less experienced. The plants suffered at times and in particular parts of the house, let us say, from lack of water, and then were drenched by the hired man; or the unsatisfied owner, seeing that things were going wrong, took the watering out of the hands of the foreman and daily flooded the house himself according to ideas evolved out of his own inner consciousness. About this time slugs, scale insects, red spider, plant lice, nematodes, and a variety of fungous diseases made their appearance in alarming proportions, and some man of my profession was sent for. Of course, he found a most interesting set of conditions, — interesting, I mean, to the pathologist, — and, possibly, was able to afford the disheartened grower the cold comfort of some good advice about what not to do next time. This is an extreme case, and yet there are plenty of such cases every year around every great city, and the troubles and failures are not all confined to beginners or to plants grown in hothouses. If the tyros were the only sufferers, we might be content to let them alone, trusting to the hard doctrine of the survival of the fittest as the all-sufficient remedy. This, however, is not the case, even old growers sometimes experiencing great losses which might have been avoided. There are now so many people engaged in growing things for market, and competition on most crops is so very close and the profits so small, that even the most experienced and successful grower must stop every leak in his expense account, and take advantage of every least chance for increasing the quantity, quality, earliness, etc., of his crops. This he can do only by a thorough understanding of all the conditions necessary for successful growth, the avoidance of parasitic diseases being one very important consideration. It is just here that plant physiologists and pathologists, while themselves learning much from the practical grower, may nevertheless be able to render him very material assistance. As such an individual, I have been invited to address you.

If, however, you expect me to tell you today how parasitic diseases may always be avoided, you are expecting the impossible and will be disappointed. The most I can do is to tell you how some of them may be prevented, and put you on your guard as to

the doing or not doing of certain things. Along with what I shall say today, I would have you remember that plant pathology is a very new science, of which as yet we barely know the rudiments.

Every year, however, adds to the sum of our exact knowledge, and it will not be long before those growers who learn and apply this new knowledge will outstrip their fellows, and have the field to themselves. Competition is not likely to decrease, nor are prices likely to advance very much, and the profits must come from avoiding losses.

It is particularly to this enterprising class of men that I should like to speak concerning the restriction of plant diseases. In this art, as in that of modern medicine, an ounce of prevention is worth many pounds of cure. There are at least three classes of growers: First, those who never learn anything except by bitter personal experience. To such men, and I may be speaking to some of this type today, much of this address may seem theoretical and impracticable. The loss of one or two crops in succession by the attack of some preventable parasite usually affords such a man the needed personal stimulus, and thereafter, as far as my own experience with such men goes, he is a faithful convert. There is a second class of growers who believe it all, know it all, and can give pointers to any expert, but are what might be called eleventh-hour men. Whether from inertia, love of ease, or inability to plan, they never get around to try any preventive until the mischief is done. Such men are the worst to deal with, since they are pretty certain to apply some remedy when it is too late, and equally certain to declare afterwards that all such remedies are worthless, as they know from "personal experience," having tried them. There is a third class of growers who are very quick to see and equally quick to apply anything likely to add to their pecuniary profit. Probably no country in the world has more men of this type than our own. They are the men whose hard common sense will try what stuff the specialist's fine-spun theories are made of, and woe to him if he is a quack, for they will surely find him out! It is this class of men whom I most fear, and at the same time most desire to reach.

I may take for granted that all of you already know that diseases which prevail extensively, and are known as contagious or "catching" diseases, are due to parasites. This is true not

only of human and animal diseases, but also of plant diseases. The plant world has its own consumption and leprosy, its cholera and black plague, its typhoid and malaria, its grippe, diphtheria, anthrax, and glanders — diseases due to other organisms and totally different, of course, in their symptoms from those I have named, but no less widespread and destructive in their course, and no less amenable to hygienic measures, than the terrible human and animal scourges with which we are all more or less familiar.

These plant parasites are plants or animals which have in some way lodged on or gained an entrance into the plant, or "host plant," as we usually designate it, and which there multiply to its detriment. Many of these organisms are exceedingly small, so as to be readily overlooked, and all of them are well provided with means of reproduction. In case of the parasitic fungi the reproductive bodies developed on a single host plant often amount to hundreds of thousands, and in case of bacteria even to hundreds of millions. These bodies are, of course, very small, requiring good microscopes and other facilities for their study, but if the conditions are favorable a single one of them may be all that is necessary to start disease in a healthy plant.

Why, then, are not all our plants destroyed outright? This leads to another question, viz., what constitutes a parasite? In a crude way, and for the sake of convenience, we often divide the lower organisms into two classes — saprophytes and parasites; the former obtaining their nourishment from dead and decaying substances, the latter nourished at the expense of other living organisms. There are, however, all grades of saprophytism and of parasitism. Any saprophyte may become a parasite if it can gain an entrance into the plant, and can there find conditions adapted to its growth. There is a constant struggle for existence in all animate nature, and one organism or another prospers according to environmental conditions. Sometimes the advantage is wholly with the host plant, at other times largely with the parasite. Many saprophytes become only slowly adapted to parasitic ways of living. Many parasites are very sensitive to light, to heat, to dry air, and perish in a short time if exposed to these conditions. Many parasites will thrive only under unusual conditions of heat and moisture. Many of the higher plants have devised special means for their own protection, such as the physical obstacle of a thick and hard covering not easily penetrated, a waxy covering

not easily wetted, a smooth covering from which the water runs off quickly; or have interposed chemical obstacles, such as a sap not adapted to the growth of the parasite. These then are some of the reasons why all of our plants are not immediately attacked and destroyed. To sum up or restate the case: First, the parasite is very liable to be destroyed by adverse conditions before it reaches the plant. Second, it must gain an entrance into the plant by its own exertions or by the help of other organisms, and this may be difficult or impossible. Third, once in, its growth may be effectually stopped by insuperable chemical or physical obstacles. Not every potential parasite becomes an actual parasite. The difficulties lying in the way are often too great for the organism to overcome and consequently a good portion of our crops escape. The business of the pathologist is to find out just what these difficulties are in case of each particular parasite and to teach the grower how he may increase them.

The most of this address will be devoted to showing just how certain parasites succeed in getting from one plant to another. It is commonly assumed, I know, that their reproductive bodies float through the air and accidentally lodge on the plants, but while not denying that this often occurs, and is perhaps in many cases the exclusive means of infection, I am certain that in some cases this rarely or never occurs, and I am inclined to believe, for reasons which I will now explain, that in quite a large number of diseases the chief danger of infection lies in other directions. I shall occasionally refer to preventive measures, but with the facts before you, you will in many cases be able to draw your own conclusions as to the best method of procedure.

The first subject to which I invite your attention is the spread of parasite organisms by means of insects.

Spread by Insects.— This is a method of distribution which has received little attention from the cultivator, but one which I am persuaded is very common. The gnawings, borings, and punctures of insects, injurious as these often are, can by no means be reckoned as the whole of the injury which they do, and sometimes they are the least part of it. As carriers of disease they are no less potent in the vegetable than in the animal world. In what I have to say under this head I shall deal only with three diseases, but these are widespread, and their dissemination by insects has been fairly well worked out:

Pear Blight. — I will not undertake to say who first ascribed the spread of this disease to insects, but the honor of clearly proving it to be so disseminated belongs to Mr. Merton B. Waite. He it was who first isolated the pear blight germ from the mouth part of bees which had visited blighting pear flowers; who saw bees pass from such flowers to healthy ones and the blight subsequently appear in the latter; and who afterwards showed conclusively on a large scale that pear flowers covered by mosquito netting always remained free from blight, while the unprotected, insect-visited ones blighted freely. There is not only no doubt that pear blight is spread through the agency of insect visits, but so far as he has been able to determine, it is never disseminated in any other way. The organism exudes from the tree in the form of small sticky or gummy masses which are not likely to be blown about by the wind, and is easily destroyed by drying. The disease occasionally winters over in the tree, and so far as Mr. Waite has been able to determine all the spring outbreaks of pear blight start from these hold-over cases, as a result of insect visits, and not from the soil. Indeed, we have as yet no evidence that pear blight lives over in the soil.

Bacterial Wilt of Cucumbers, Muskmelons, Pumpkins, and Squashes. — This is a common disease in the northern United States, and often does great injury. It is due to a very sticky, white micro-organism which fills the water ducts, and thus brings about a sudden collapse of the plant. I have experimented with it extensively since 1893, and find it to be readily communicated by the striped cucumber beetle and sometimes also by squash bugs. Wilting vines are very full of virulent, sticky germs, ready to be carried away on the beak or jaws of the first visiting insect and deposited on the surface or in the interior of the next plant that is bitten. On one occasion I examined nearly a thousand freshly blighted leaves, and found small gnawed places inside of the blighted area of every one, and in such relation thereto that the wilt appeared to have proceeded outward from the bitten places. Subsequently I produced the disease by allowing striped beetles and squash bugs to feed on diseased leaves and then on healthy plants. My greenhouse inoculation experiments with this bacillus now exceed four hundred, but I have never had the disease escape from inoculated plants to controls, and I believe that in the field it is spread almost wholly, if not exclusively, by insects. In

what form or in what place it passes the winter, I do not yet know, but given one affected plant in a squash or cucumber field in June or July, and plenty of beetles to feed on it, and in a month or six weeks there will frequently be more diseased than healthy plants. That all are not destroyed by it appears to be due largely, if not wholly, to the fact that it is readily killed by exposure to sunlight and to dry air.

Bacterial Brown Rot of the Potato, Tomato, and Egg-Plant. — The Department of Agriculture has recently published a bulletin on this disease, which some of you may have seen. This disease is also disseminated by insects, and in all probability owes the greater part of its destructiveness to this fact. The insects feed on diseased plants that are swarming with the parasite and then crawl or fly to other plants, which are bitten and subsequently become diseased. I do not yet know how widespread this disease may be, but am now inclined to attribute to it a large part of the potato rot of the eastern United States. It may be known by the sudden wilt of the foliage, the stems becoming brown internally and shrivelling. The bacillus passes down the interior of the stem into the tubers, and brown-rots them from within. I succeeded in communicating this disease from sick to healthy plants very readily by means of Colorado potato beetles. They were taken from healthy potato fields which remained healthy, were allowed to feed on diseased leaves and stems for a few hours and then transferred to healthy plants, which they gnawed a little in various places, but from which the beetles were removed before they had done any serious injury of that sort. Seven to nine days later the plants suddenly developed the disease on many parts of the top, corresponding to many bites, and the progress of the disease after the first day or two was rapid. As the spread of this disease is simply a matter of the transfer of a few germs from the interior of diseased to the interior of healthy plants, I do not see why any gnawing or puncturing insect might not serve just as well as the potato beetle as a carrier of this disease.[1]

Spread by Snails and Slugs. — The rôle of mollusks in the dissemination of fungous and bacterial diseases is also an impor-

[1] As this paper goes through the press (Feb., 1898), Dr. W. C. Sturgis, of the Connecticut Agricultural Experiment Station, reports the interesting discovery that the mildew of Lima beans (*Phytophthora Phaseoli*, Thaxter) is disseminated by bees which visit the flowers for nectar.

tant one. The subject is new even to scientific men, and most cultivators know nothing about it. Nevertheless, the indirect damage done by these animals as carriers of disease germs is often immensely greater than the immediate and visible injuries they induce by feeding. Again I shall refer only to a few cases, but these I consider to be well-established ones.

Wagner's Experiment with Snails. — Last year a German by the name of G. Wagner published an interesting paper on the spread of fungi by snails. He experimented with downy and powdery mildews, ascomycetous fungi, and rust fungi. Snails of various sorts were transferred from diseased to healthy plants, and the disease appeared on the latter; they were fed various parasitic fungi, and a subsequent examination of the excreta showed that the spores of these fungi passed through the animals uninjured, and in condition to germinate. Finally, the dung of these snails was dissolved in water and painted on the leaves or stems of host plants and the disease followed.

In this way, three downy mildews, two powdery mildews, one Nectria, and one rust fungus were transferred to healthy plants of various sorts. Mr. Wagner thinks that fungi are very commonly distributed by snails.

Galbraith's Experiments.— Mr. Galbraith, an Englishman living in the Seychelles islands, has recently obtained equally interesting results with snails, which he finds to be largely responsible for the spread of a vanilla disease prevalent in those islands.

The Bacterial Brown Rot of Cabbage. — This disease is prevalent in many parts of the United States, and is tolerably well known to market gardeners. It blackens the veins of the leaves and the woody ring in the stem, causes the leaves to fall off, and prevents the formation of heads, or spoils those which have already formed. It is due to a micro-organism, and is disseminated in various ways. I have myself the present winter obtained striking infections by means of the common greenhouse slug. These animals were fed on diseased cabbage leaves and then transferred for a few hours to healthy cabbage plants, the disease appearing a week or two later. Insects are probably also carriers of this disease.[1]

I will next invite your attention to the danger of spread of parasitic diseases by way of the manure pile.

[1] Since this was written I have obtained conclusive evidence, using the "Southern cabbage worm" (larvæ of *Plusia brassicæ*), and have been able to confirm these green-house experiments by many observations in the field.

Spread through the Manure Pile. — Barnyard manure always contains a great variety of organisms, most of which are harmless to plants. Occasionally, however, some parasite gets into the manure heap, finds a congenial place for extended growth, and is finally hauled out by the unsuspecting cultivator and put just where it can do him the most damage. Sometimes the spores of these parasites get in through the fodder or bedding, but they are also probably occasionally introduced along with mouldy or rotting vegetables which have been thoughtlessly thrown into the barn yard or on to the manure pile. One of the most striking cases that has come under my own observation is worth describing somewhat in detail.

The Watermelon Wilt. — This disease of the watermelon is due to a fungus (*Fusarium niveum*) which enters the plant through the soil and fills up its water-conducting system, causing sudden wilt and subsequent death. It prevails extensively from South Carolina to Texas, and is by far the worst trouble melon growers have to contend with. The fungus lives over winter in the dead stems, and grows readily in manure. In 1894 I was sent to South Carolina to investigate this disease, at the urgent request of a planter who had lost nearly his whole crop. Nothing was then known as to the cause of the disease, and the conclusions I shall here give you are based on studies of the disease which have since been made in the laboratory and field. The man of whom I speak had planted seventy acres, and nearly the whole crop was affected by this disease, just that part of the field being most severely attacked that had been most carefully manured. He had formerly been a very successful melon grower, but had suffered some from this disease the preceding year. In order to have an extra fine crop, by way of compensation for losses of the previous year, he had raked and scraped every bit of litter he could procure from the whole farm, and made a large compost heap in his barnyard. Into this heap went also the refuse of a thirty-five acre melon field of the preceding year. This consisted principally of hay cut from the field in the fall, and including many dry melon vines full of the fungus, which only needed the moisture and food supply of the dung heap to grow again luxuriantly. In the spring, when he had unwittingly made an immense culture bed of his barnyard, he hauled out this infected manure and put it under his melon hills, with most disastrous results. I

have since obtained confirmatory results in other places, and am very certain that this disease was in that instance spread by way of the manure pile. Probably it is often disseminated in this manner. I shall have more to say of this interesting disease under another head.

Smut Diseases. — Some of the smut diseases are also well known to be transmissible through dung, especially in fresh manure, and for this reason the latter should never be used on fields of cereals.

Other Diseases. — While not conclusive, the evidence is strong that many diseases come out of the dung pile. I recall a bad outbreak of the so-called timber rot of cucumbers in a hothouse near Washington where it seemed almost certain that the fungus was introduced with the manure. And within the last six months three cases have come to my knowledge where serious diseases followed unusually heavy applications of manure. One of those was a sclerotium disease of ginseng in Pennsylvania, another the bacterial brown rot of turnips in Maryland, and the third a rot of celery in Florida.

This subject is at least worthy of much more careful attention than it has hitherto received, and would undoubtedly amply repay all the time put upon it. Manure should at least be kept free from the rubbish of plants that have been attacked by parasitic diseases and ought to be thoroughly composted and rotted before it is used.

Spread by Way of the Soil. — Certain parasitic diseases of plants are peculiarly soil troubles. Their home is the earth. They live and multiply in the soil indefinitely as saprophytes, and yet are always ready to become parasites when there is an opportunity. Not enough attention has been paid to this class of diseases. Among these soil fungi are some of the worst enemies the cultivator has to contend with. They are hidden out of sight, are very difficult to combat by fungicidal treatment, and when a field is once well seeded down to one of them it is practically worthless for the growing of such crops as are subject to the disease, the only satisfactory management of the land in most cases being a long rotation with crops not subject to the attacks of the parasite. These soil fungi manage to get about from field to field in various ways. Some of them are known to have been distributed in irrigation water or to have been washed

from higher to lower fields by floods; some have been carried by the plow or other tools, or on the feet of animals. Occasionally man himself digs them up and transports them into hotbeds, greenhouses, and fields. One year all of our potting soil at the Department was so badly infested with the damp-off fungus that plants could be gotten past the seedling stage only with great difficulty. Frequently these fungi creep through the earth for considerable distances, destroying nearly everything they meet or only certain species of plants. Others distort or corrode underground parts without destroying the plant. Onion smut, potato scab, the club-root of cruciferous plants, the fairy-ring fungus, Rolf's sclerotium disease, the cotton root rot; the *Dematophora necatrix*, destructive to the roots of grape vines, figs, and many other plants; the *Polyporus annosus; Trametes radiciperda*, especially destructive to the roots of coniferous trees; and the root fungus of New Zealand, which is said to destroy every sort of plant in its way, are examples of these soil parasites. I shall mention particularly only one type of these troubles, viz.:

The Fusarium Diseases of the United States. — It has fallen to my lot to study some of these parasites quite carefully, and I now know eight important cultivated plants subject to them, viz., cotton, cow-pea, watermelon, cabbage, potato, tomato, sweet potato, and pineapple. Whether we have here to deal with eight parasites or with only one widely distributed polymorphic organism remains to be determined. I am inclined to think, however, from my own numerous experiments, covering a series of years and not yet completed, that we have to do with closely related but distinct forms. All of these host plants are seriously injured and some of them over wide areas. In all of them the trouble is due to a sort of embolism or parasitic clogging of the water ducts of the plant. I have already alluded to the watermelon wilt when speaking of parasites disseminated in barnyard manure, and will here devote most of my remarks to that disease. It occurs from the Carolinas to Texas, and has practically put an end to profitable melon culture in parts of South Carolina, Georgia, Florida, and Texas. The plants are attacked in all stages from seedlings to mature vines in fruit. The first sign is a sudden wilting of the whole or a part of the vine without apparent cause. The fungus enters the plant from the soil and almost always destroys it. I have seen large fields entirely

ruined by it, and know of fertile tracts miles in extent where melon culture has been abandoned. When the soil is once infested it is worthless for melon growing for a long time — five to seven years, according to South Georgia growers who have had much experience with it.

A successful Sea Island cotton grower writes that he has abandoned fifteen acres of his best cotton land on account of this blight. A New York cabbage grower informs me that his best soil, which formerly yielded abundant crops, is now worthless for cabbage growing, and I know from a careful examination that his sole trouble arises from the fact that his soil is infested with a parasitic Fusarium. Undoubtedly these troubles have arisen, or at least have become intensified, by too frequent growing of the same crop, and the best remedy is to be found in a wide rotation. At present I know of no other.

Spread by Way of Seeds, Seedlings, Buds, Tubers, Cuttings, and Nursery Stock. — One of the best examples of a disease disseminated on seeds is the loose smut of oats and wheat. The smut spores simply adhere to the sound kernels, germinate at the same time as the kernels, and bore into the young seedlings, to remain hidden till the plants blossom. The parasite of beet burn finds its way to the young seedlings in much the same way, being carried to the beet fields along with the seed. Potato scab is spread in much the same way, *i.e.*, from the mother tuber to the progeny, but this parasite also lives over in the soil. A bad lettuce Septoria, which sometimes causes much trouble, appears to be carried over from year to year, and spread from place to place in the seed.

Many diseases are distributed in seedlings, bulbs, buds, and cuttings, and too much care cannot be exercised in their selection. Among these may be mentioned the Easter lily disease, the yellow disease of hyacinths, certain violet diseases, the California vine disease, peach yellows, peach rosette, peach mildew, and peach curl.[1]

But perhaps the most wholesale manner of distribution is through the medium of irresponsible nurserymen. In this way all sorts of fungi and insect pests are spread from one end of the

[1] Since this was written I have found that the bacterial brown rot or black rot of the cabbage is often transplanted to healthy fields from the seed bed along with the young plants. (See "Farmers' Bulletin," No. 68, U.S. Department of Agriculture, for a full account of this discovery.)

country to the other. Many examples might be adduced. The most notorious recent one in this country is the wholesale distribution of the pestiferous San José scale in the eastern United States by two New Jersey nursery men. More than this, some dealers appear to be still sending out infested trees in spite of claims to the contrary. There is no good reason why all of this nursery stock should not be fumigated in a dormant condition. If done properly the scales would be destroyed without injury to the plants. The only safety for growers appears to be in demanding this, and in refusing to accept any trees or other plants which are not clean. The damage to an orchard which is certain to result from the introduction of a single tree infested with the San José scale is so great that it becomes every fruit grower to be on his guard. The white scale or West Indian scale of the peach is also very destructive and should be guarded against with great care. If by any accident it should be as widely distributed from nurseries as the San José scale has been, it would injure the peach orchards to quite as great an extent, a few years sufficing to destroy the most robust trees. I have sometimes called it the "whitewash scale" because at a little distance affected trees look as if covered with lime.

GENERAL CONCLUSIONS RESPECTING PREVENTIVE MEASURES.

1. *Prompt Removal and Destruction of Diseased Material.* — There are special reasons for this, owing (*a*) to ability of many parasites to grow and fructify on the plants, or parts of plants, which they have already destroyed, *i.e.*, to live as pure saprophytes, and (*b*) to the persistent vitality of many other sorts under what would seem to be very unfavorable conditions, *e.g.*, after being dry for months. The fusarium of watermelon grew from a dried-out laboratory culture after two and one-half years.

Practical application in:

(1) *Field.* — Pear blight, rot of stone fruits, lemon scab, black knot of plum and cherry, peach yellows, San José scale (when restricted to a few trees).

(2) *Greenhouse.* — Rust of chrysanthemums and carnations, spot of violets, rot of lettuce, black spot of roses, anthracnose and timber rot of cucumbers, wet rot of hyacinths, etc.

It is not enough to pick off the diseased parts. They must be disposed of properly. Loss may result from throwing diseased

leaves or plants under the benches. If this is the only method of disposal they might almost as well be left in place. It is generally best to burn them.

2. *Destruction of Insects and Mollusks.* — More practicable in some cases than in others.

(1) *Field.* — In the field we may make use of hand picking, nets, resin wash, kerosene emulsion, and traps of various sorts. No very satisfactory method of dealing with certain of these carriers of disease has yet been worked out. The discovery of cheap efficient ways of destroying these insects furnishes many interesting problems for the economic entomologist. A combination of this method and the preceding (removal of diseased material) is recommended for such diseases as the brown rot of the potato and cabbage and the bacterial wilt of cucurbits. Root aphides may sometimes be reached by tobacco dust dug into the soil. Root nematodes specially infest certain soils, and are difficult to combat.

(2) *Hothouse.* — The troubles most prevalent in hothouses are aphides, scale insects, red spiders, root nematodes, roaches, and slugs. Slugs may be handpicked at night. Roaches are easily poisoned with a mixture of phosphorus and honey. Nematodes in hothouses are seldom troublesome except when the potting soil is full of them to begin with or when the plants have been systematically overwatered, and in either case the remedy is obvious. Red spiders are often very troublesome, especially when the air of houses has been kept too dry. They are not easily destroyed by the common insecticides, snapping their legs, so to speak, at tobacco smoke and even at the deadly hydrocyanic acid gas, of which they can endure more than the plants. The best remedy is not to let the plants become infested, and the best palliative is frequent douching of the plants with a fine spray of water. Plant lice are readily held in check by fumigation with tobacco. This, however, must be managed with care, as radishes, violets, and some other plants are peculiarly sensitive, and a single careless fumigation might do more injury than a dozen generations of aphides. I have seen the following arrangement for fumigation in a large rose house in Washington, and many of you are probably already familiar with it: Long, narrow, shallow galvanized-iron pans half full of a very strong tobacco water were distributed down the aisles of the house, and into these about once a week was dropped a good-sized red-hot

rod or spike. These spikes were heated in the furnace and carried rapidly through the house in an iron basket. The house is quickly filled with tobacco steam. The manager assured me that this method was cheaper, less injurious to the plants, and more effective than the ordinary dry air method of tobacco fumigation. They were cutting thirteen hundred buds a day from this house and the thrift and beauty of the plants were remarkable.

Scale insects are not so easily killed; most of them will thrive on tobacco smoke and ordinary sprays. We have, however, found hydrocyanic acid gas very cheap and effective. It is a deadly poison, and must be used with the greatest care. In intelligent hands I am persuaded that it is the coming remedy for this class of troubles. There must, however, be considerable experimenting and testing on the part of specialists before it comes into general successful use. Not only does it quickly diffuse through the air and speedily kill those who breathe it, but it also kills the plants as well as the scales, if the dose is too strong. Furthermore, plants are sensitive to it in very different degrees, as Mr. A. F. Woods has shown, so that a dose which will not harm one plant will kill another. In any given case it must be determined in advance; first, what is the minimum dose for the scale, and, second, that this dose will not harm the plants. When these two facts have been ascertained the cubic contents of the house to be fumigated must be accurately computed, and then the proper amount of gas may be liberated after the house has been closed as tightly as possible and the roof wet down to make it still more air-tight. Details as to manufacture and liberation of the gas, method of computing air space, and proper dose for certain plants have been published recently by Mr. P. H. Dorsett, in the "Florists' Exchange," and I will not here describe them.

By use of this method I have seen one hundred thousand foliage plants (coleus, achyranthes, etc.) which were covered with orthezia and ruined for transplanting freed from every scale in twenty minutes' time at a trivial expense, and without the least injury to the plants. I have also known of the gas being used successfully in violet houses for the destruction of aphides.

(3) *Fungicidal Treatment.* — Among fungicidal treatments may be mentioned sulphur dusting, use of lime, use of mercuric chloride, hot-water treatment, and spraying with copper compounds. Diseases amenable to one or other of these treatments are

powdery mildew, club-root of crucifers, potato scab, wheat and oat smut, downy mildew of grape, black rot of grape, pear and quince leaf blight, pear and apple scab, melanose of orange, and damp-off fungi.

(4) *Indirect Methods* — *i.e.*, by furnishing the host plant with the best possible conditions for growth and the parasites with the poorest. To apply these measures properly requires a very considerable body of knowledge, both of the needs of the crop grown and of the life history of the parasite. Here is just where many growers fail, and this is why so many hothouses seems to have been erected as a special banqueting chamber for bugs and fungi of all sorts. The first thing that the owner of such a house needs to do is to learn the habits of the parasites and study the requirements of his plants until he can properly repress the one and cater to the other. Many houses are badly adapted to the requirements of the crops grown in them.

Some of the diseases commonly observed in houses, and due almost wholly to mismanagement, may be noted very briefly:

The powdery mildew of the rose, cucumber, etc., is brought on very largely by chill due to improper ventilation. Cucumber anthracnose and the timber rot are favored by excess of water and insufficient ventilation. Some houses are so constructed that they cannot be properly ventilated. Timber rot is found specially in damp corners, where the water remains in the angles of stems and leaves for hours together. The lettuce rots due to Botrytis and to the downy mildew are often brought on by excess of water and irregular heating. If time permitted, many other instances might be cited.

Sometimes these troubles are due to the attempt to grow too many kinds of plants in the same house. In such cases the grower generally tries to follow a medium course in the matter of heat, ventilation, and water-supply, and in doing so furnishes normal condition for none of his plants.

Certain field diseases may also be restricted by stimulating the plants to make the best possible growth, or in case of the onion smut, as Dr. Thaxter and Dr. Sturgis have shown, by growing the plants in soil free from the fungus and not setting them out into the infected earth until they are beyond the receptive stage.

Concerning care in the use of manure, in the selection of seeds and cuttings, and in the buying of trees and other plants, I need not say more than I have already done.

EXPERIMENT STATION REPORTS WANTED.

The Massachusetts Horticultural Society is endeavoring to collect complete sets of the Bulletins and other publications of all the Agricultural Experiment Stations in the United States and Canada. Those named below are wanting, and any person having a spare copy will confer a favor by addressing the Librarian of the Society, Horticultural Hall, No. 101 Tremont Street, Boston.

Alabama (Ag. and Mech. College Station). — Bulletins 4–6 (1884), 7–10 and 1–4 (1885), 5–9 (1886). 7th Annual Report, for 1894.

Alabama (Canebrake Station). — All Annual Reports later than the 3d, for 1890.

Arizona. — 4th Annual Report, for 1893.

Arkansas. — Bulletin 1. All Annual Reports later than the 4th, for 1891.

California. — Bulletins 32, 1878, and 1, 2, 3, 5, and 50, New Series.

Colorado. — Bulletin 3.

Connecticut (New Haven Station). — Bulletins 1 to 67, inclusive. Annual Reports for 1877 to 1883, inclusive, except that for 1878.

Indiana (Purdue Univ. School of Ag.). — Bulletin 1. College Reports 1 to 14, inclusive.

Kentucky. — Bulletin 10.

Michigan. — 6th Annual Report, for 1892–93. (Contained in Report of Michigan Board of Agriculture, 1893.)

Missouri. — Bulletins 9, 13, 15, 16, 19, 20, 25, 26, and 33 of Old Series. All Annual Reports since the 1st, for 1888.

New Jersey. — Bulletins 1, 4, 5, 15, 27, and 28.

New York (Cornell). — Annual Report, 1882–83 (Report of Agricultural Department of Cornell University).

North Carolina. — Bulletins 1 to 56, inclusive, and 69, 2d ed. Meteorological Division, Bulletin 2 (68*b*), and 2d and 3d Annual Reports, for 1888 and 1889. Special Bulletins 1 (77*a*) and 4 (82*a*). Weekly Weather Crop Bulletins 1–21, 1888; 1–24, 1889; 1–25, 1890; 2 and 4, 1891.

North Dakota. — 4th Annual Report, for 1893.

Ohio. — All Bulletins of First Series, except 16, 17, 18, and 19.

Pennsylvania. — Annual Reports for 1869, 1872, 1879–80, 1881, 1882, 1883, and 1884. [All issued by the State College.] Annual Report for 1895. Bulletin of Information No. 1.

South Carolina. — All Bulletins of the Old Series (previous to 1888) on the work of the Experimental Farm of the South Carolina College. 3d Annual Report, for 1890, and 6th, for 1893.

Texas. — College Bulletins 1–5, 1883–1887.

West Virginia. — Special Bulletin — Potash and Paying Crops, 1890. All Annual Reports later than the 3d, for 1890.

Ontario Department of Agriculture, Toronto. — Bureau of Industries. — Agricultural Returns to the Ontario Bureau of Industries, Nov. 1882 (5th), Aug. 1883 (7th), and Nov. 1887 (20th).

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1897.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1898.

☞ SEE LAST PAGE OF COVER.

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, April 3, 1897.

A duly notified Stated Meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

Benjamin M. Watson, Chairman of the Committee to procure a portrait of Ex-President Nathaniel T. Kidder, reported that the Committee had performed that duty, and asked to be discharged. The report was accepted and the Committee was discharged.

The President read a communication from J. D. W. French, Chairman of the Committee on Lectures and Publication, stating that the Committee desire suggestions as to subjects and lectures for another year; also that a book is in the hands of the Secretary where such suggestions can be inscribed, and that the Committee desire the coöperation of the members in making the lectures as far as possible instructive and entertaining.

Charles E. Richardson read his Annual Report as Treasurer for the year 1896, which was accepted, adopted, and ordered to be printed.

O. B. Hadwen announced the decease of Edward Winslow Lincoln, an Honorary Member of this Society, and for thirty-five years Secretary of the Worcester County Horticultural Society, and who had devoted his life to the advancement of Horticulture, and moved the appointment by the Chair of a committee to prepare memorial resolutions. The motion was carried, and the Chair

appointed as that Committee Mr. Hadwen, E. W. Wood, and Robert Manning.

Benjamin M. Watson announced the decease of Charles Eliot, who, he said, was a man thoroughly identified with horticultural matters from the time of his graduation from college, — few had been so thoroughly identified, — and moved the appointment of a committee to prepare a memorial of him. The motion was carried, and the Chair appointed as that Committee Mr. Watson, Ex-President Dr. Henry P. Walcott, and James H. Bowditch.

It was voted that the Committees on memorials to Messrs. Lincoln and Eliot be authorized to send the respective testimonials to the families of the deceased as soon as prepared.

Robert Manning announced the decease of Dr. Robert Hogg, of London, editor of the "Journal of Horticulture," author of the "Fruit Manual," and one of the leading horticulturists of Great Britain, and a Corresponding Member of this Society. It was voted that the President and Secretary write a letter to the family of Dr. Hogg expressing the Society's sense of the loss sustained by it in his decease.

The subject of awards of premiums and gratuities to persons not members of the Society was brought up by the President, and after discussion by M. H. Norton, Joseph H. Woodford, William C. Strong, William J. Stewart, O. B. Hadwen, and Mrs. E. M. Gill, the subject was, on motion of Mr. Hadwen, referred to the Executive Committee with full powers.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

George B. Dorr, of Boston,
Charles H. Rea, of Norwood,
Frederic J. Rea, of Norwood,
Charles Sander, of Brookline,
Thomas J. Grey, of Chelsea,
Ernest W. Bowditch, of Milton,
Mrs. Mary L. Stevens, of Cambridge.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, May 22, 1897.

A Special Meeting of the Massachusetts Horticultural Society was holden at eleven o'clock today, in accordance with the following request:

To the President of the Massachusetts Horticultural Society:

DEAR SIR: We hereby request you to call a Special Meeting of the Society, to be held on Saturday, the twenty-second day of May next, at eleven o'clock in the forenoon, to determine whether the Society will ratify an agreement lately made by the Finance Committee, subject to ratification by the Society, for the settlement of the controversies respecting the validity of the will and trusts of Francis B. Hayes, deceased; and also to consider what action the Society will take for the determination of questions which have arisen or may arise respecting the interests of the Society under said will and trusts, and the care and management of property which may come to the Society thereunder.

BOSTON, May 17, 1897.

(Signed) WALTER HUNNEWELL,
BENJ. C. CLARK,
T. O. FULLER,
NATHANIEL T. KIDDER,
CHAS. H. HALL,
CHAS. E. RICHARDSON,
JOS. H. WOODFORD,
GEO. F. PEIRCE,
A. SHUMAN,
E. J. MITTON,
CHAS. W. PARKER,
ROBERT MANNING.

In compliance with this request, agreeably to Section XII of the Constitution and By-Laws the following notice was sent by mail to every member of the Society:

MASSACHUSETTS HORTICULTURAL SOCIETY,
BOSTON, May 17, 1897.

Agreeably to the Constitution and By-Laws, at the request of twelve members of the Society the President hereby calls a

Special Meeting of the Society, to be held at Horticultural Hall, No. 101 Tremont Street, Boston, on Saturday, the twenty-second day of May, 1897, at eleven o'clock in the forenoon, to determine whether the Society will ratify an agreement lately made by the Finance Committee, subject to ratification by the Society, for the settlement of the controversies respecting the will and trusts of Francis B. Hayes, deceased; and also to consider what action the Society will take for the determination of questions which shall have arisen or may arise respecting the interests of the Society under said will and trusts, and the care and management of property which may come to the Society thereunder.

(Signed) FRANCIS H. APPLETON,
President Massachusetts Horticultural Society.

ROBERT MANNING,
Secretary.

At this meeting the President, FRANCIS H. APPLETON, was in the chair. The call for the meeting was read by the Secretary. It was voted to dispense with the reading of the records of the last meeting.

The President appointed the following named members as the Committee on School Gardens and Children's Herbariums for the year 1897:

Henry L. Clapp, *Chairman.*

Mrs. H. L. T. Wolcott,	Mrs. P. D. Richards,
George E. Davenport,	William P. Rich,
Miss Katharine W. Huston,	W. E. C. Rich, *Secretary.*

The President stated that Joseph B. Warner, Esq., who had been employed by the Finance Committee as counsel for the Society in the Hayes will case, was present, and it was voted to hear Mr. Warner in regard to that matter.

Mr. Warner submitted to the meeting an agreement dated May 14, 1897, made by the Finance Committee, on behalf of the Society, with Nino K. Hayes, William Minot, guardian of Harold Hayes, and Augustus P. Loring, and approved by the Attorney-General of the Commonwealth, providing for the settlement of certain questions respecting the will of Francis B. Hayes, deceased. Subsequently it was moved by Ex-President William C. Strong, and seconded by Benjamin P. Ware, that the following vote be passed:

Voted, That the agreement which has been submitted to this meeting, dated May 14, 1897, and made by the Finance Committee, on behalf of this Society, with Nino K. Hayes, William Minot, guardian of Harold Hayes, and Augustus P. Loring, and approved by the Attorney-General of the Commonwealth, providing for the settlement of certain questions respecting the will and trusts of Francis B. Hayes, deceased, is hereby ratified, and the Finance Committee, or a majority of its members as it may be at any time constituted, are hereby authorized to do all acts, execute all papers and instruments on behalf of the Society, and make all payments which may be necessary or proper, in their judgment, to confirm said agreement and carry out its terms.

This vote was unanimously passed.

It was then moved by Ex-President William H. Spooner, and seconded by Mr. Ware, that the following vote be passed:

Voted, That the whole matter of the interests of this Society under the will or trusts of Francis B. Hayes, deceased, is hereby referred to the Finance Committee, with full power to that Committee, or a majority of its members as it may at any time be constituted, to determine, in their discretion, or by proceedings at law or equity, or by compromise, or in any way which may seem to them wise, all questions which have arisen or may arise in any way concerning the rights and interests of the Society under said will or trusts, or concerning the care, management, valuation, or disposition of the property covered by said will or trusts; and generally with full power to act in all respects for this Society in all matters concerning its interests under said will and trusts; and with full power also to invest any money which may come to the Society from said will or trusts until further action shall be taken by the Society concerning the same.

This vote also was unanimously passed.

Augustus Parker moved that a vote be passed thanking the Executive and Finance Committees and Mr. Warner, the counsel employed, for their able and discreet management of the interest of the Society in the Francis B. Hayes will case.

The vote was unanimously passed.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, July 3, 1897.

A duly notified Stated Meeting of the Society was holden today at eleven o'clock. In the absence of the President and all the Vice-Presidents, the meeting was called to order by the Secretary, and Ex-President WILLIAM H. SPOONER was elected Chairman *pro tem.*

The Chairman read a letter from John G. Barker, Chairman of the Committee on Gardens, resigning his membership of that Committee, on account of necessary absence from Boston, and thanking the Society most heartily for the honor conferred on him in electing him for many successive years to important positions on the Flower and Garden Committees. The resignation was accepted, and Patrick Norton was nominated from the floor to fill the vacancy, and elected.

The Chairman presented a report from the Executive Committee, to whom was referred at the April meeting the subject of awards to persons not members of the Society, recommending that the subject be laid on the table. The report was accepted and adopted.

O. B. Hadwen, Chairman of the Committee to prepare a memorial of the late Edward Winslow Lincoln, of Worcester, an Honorary Member of this Society, presented the following report:

MEMORIAL OF EDWARD WINSLOW LINCOLN.

In the death of Edward Winslow Lincoln, of Worcester, this Society has lost an Honorary Member distinguished for his services to Horticulture during the last thirty-five years. Endowed with a natural as well as a highly cultivated taste, improved by his long term of service as Chairman of the Parks Commission of the City of Worcester and Secretary of the Worcester County Horticultural Society, his annual reports of each have abundantly manifested his strong love of assisting Nature, in gardens, parks, and landscapes. The influence of his life work has stimulated the adornment of horticulture in public and private places, and the landscape situated within the scope of his influence is graced with additional charms which he loved to encourage.

The science, the practice, and the literature of Horticulture have

been vastly promoted by the productions of his accomplished pen, and horticultural interests have gained in solid development by his untiring labors. His life work remains an enduring monument to perpetuate his memory.

Herewith we desire briefly to place upon the record of this Society our deep sense of the loss which horticulture has sustained by his death.

O. B. HADWEN,
E. W. WOOD,
ROBERT MANNING,
} *Committee.*

The report was unanimously accepted and adopted.

Benjamin M. Watson, Chairman of the Committee to prepare a memorial of Charles Eliot, presented the following report:

The Massachusetts Horticultural Society wishes to record here, through the Committee appointed for the purpose, the death of Charles Eliot, of Brookline.

It is seldom that such deep public regret is so conspicuously shown at the death of so young a man; we, as members of a Horticultural Society, have peculiar reason to mourn.

No one of the present generation has shown greater ability in matters pertaining to the art of gardening on an extensive scale than Mr. Eliot. From the time of his graduation to the time of his death all his strength and energy had been given to the improvement of public lands and private grounds.

Mr. Eliot became a member of this Society November 4, 1893.

After graduating at Harvard he took a course of one year at the Bussey Institution, spending much time in studying the trees and shrubs in the Arnold Arboretum, often coming back for this purpose after his course was finished. He soon entered the office of Frederick L. Olmsted, as a student; first, however, spending some time in Europe, familiarizing himself with foreign parks and gardens. On completing his studies with Mr. Olmsted he established himself in business in Boston, and soon obtained numerous clients.

It was at this time and later, while he was a member of the firm of Olmsted, Olmsted, & Eliot, that he became identified with those undertakings by which he will be long remembered. While a member of the Appalachian Mountain Club he was one of the

founders of the corporation known as "Trustees of Public Reservations," its Secretary and President; from this organization sprang our admirable Metropolitan Park System. Mr. Eliot was the first Landscape Architect appointed by the Commission, and he continued in their service until his death. To him, more than any other man, the community is indebted for the preservation and improvement of these large tracts of land.

He was easily the best professional writer of the day on Landscape Gardening. His style was clear, earnest, and convincing, and he allowed no minor considerations to stand in the way of what he deemed the broadest and finest treatment looked at from the future, and no man during the past few years has done so much towards crystallizing the better inspirations of our community in this direction than Charles Eliot.

Thoroughly informed by study, observation, and mature consideration, he brought also to his professional activity the influence of a trained intellect and a real personal charm.

The loss of a man who united so many admirable qualities will be long felt and sincerely remembered by his associates here.

H. P. WALCOTT,
B. M. WATSON,
J. H. BOWDITCH,
} *Committee.*

BOSTON, 14th April, 1897.

This report, also, was unanimously accepted and adopted, and ordered to be entered on the records.

The Chairman read a letter from the Boston Society of Natural History asking the Society to join with the Society of Natural History and the several leading scientific and educational institutions in this city in an invitation to the American Association for the Advancement of Science, to celebrate the fiftieth anniversary of its organization in Boston, its birthplace, in August, 1898. This letter had been considered by the Executive Committee, who advised that this Society unite with the Society of Natural History in the invitation to the Association for the Advancement of Science. On motion of Nathaniel T. Kidder, it was voted that this Society do so unite.

On motion of William C. Strong, it was

Voted, That the President be authorized to offer the use of our Hall to the American Association for the Advancement of Science,

for the purpose of holding its meetings when in session in the City of Boston in 1898, in case this Society is in his opinion able to do so.

The Chair announced the following Committee, appointed by the President, agreeably to the Constitution and By-Laws, to nominate candidates for Officers and Standing Committees for the year 1898:

William H. Spooner, *Chairman*.

Benjamin M. Watson,	Patrick Norton,
Samuel Hartwell,	Azell C. Bowditch,
Benjamin P. Ware,	Charles F. Curtis.

The Chairman announced the receipt of a letter from Mary Yale Eliot, acknowledging the receipt of the memorial of her late husband, Charles Eliot, and expressing her high sense of its value, and also a letter from Robert Milligan Hogg, of London, of similar tenor, in reply to a letter written by the President and Secretary of this Society, agreeably to the vote of the Society at the April meeting, expressing the Society's sense of the loss sustained in the decease of its Corresponding Member, Dr. Robert Hogg.

The decease of Hon. Joseph S. Fay, an Honorary Member of the Society, was announced, and Dr. Henry P. Walcott, E. W. Bowditch, and Walter Hunnewell were appointed to prepare a memorial of him.

The decease of Robert Douglas, of Waukegan, Ill., a Corresponding Member of the Society, was announced, and Charles S. Sargent, J. W. Manning, and James H. Bowditch were appointed a Committee to prepare a memorial.

The following vote, moved by Joseph H. Woodford, was passed:

Voted, That the Secretary write to J. G. Barker, requesting him to send warrants, signed by him, to the Treasurer, for payment of services by his Committee.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

OSBORN B. HALL, of Malden,
FREDERICK W. DAMON, of Arlington,
GEORGE H. BRAMAN, of Newton,
WILFRED WHEELER, of Concord,
Dr. MARY E. JONES, of Boston.

On recommendation of the Executive Committee,

Hon. JAMES WILSON, Secretary of Agriculture, Washington, D.C., was elected an Honorary Member of the Society, and

J. W. HOFFMAN, Ph.D., Director of the Department of Agricultural Biology and Chemistry in Tuskegee Normal and Industrial Institute, Tuskegee, Alabama, was elected a Corresponding Member.

Adjourned to Saturday, September 4.

BUSINESS MEETING.

SATURDAY, September 4, 1897.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

William H. Spooner, Chairman of the Committee appointed at the July meeting to nominate candidates for Officers and Standing Committees for the year 1898, reported a printed list, which was accepted. It was voted that the Committee be continued, and requested to nominate candidates to fill any vacancies that might occur before election.

The following memorial of Hon. Joseph S. Fay, prepared by the Committee appointed for that purpose at the July meeting, was presented and adopted:

Hon. Joseph Story Fay, an Honorary Member of the Massachusetts Horticultural Society, died at Boston on the 14th of June, 1897.

Many years ago he began, at his seaside home at Wood's Holl, the tree plantations which made him one of our earliest and most successful leaders in the reforesting of the denuded areas of the State.

In the later years of his life he entered the lists at the exhibitions in this Hall with specimens of fruits, flowers, and vegetables which fairly earned an unusual number of our highest prizes.

Beyond these successes, however, were those personal qualities which will attach to his memory the lasting sentiments of gratitude and respect of so many persons.

An appropriate permanent memorial of him exists in the seventy acres of charming natural scenery in the town of Falmouth, given by him to the people as a continued place of recreation, and happily named by him "Goodwill Park."

The multitudes that he made partners with him in all the attractions of his beautiful garden at Wood's Holl will long remember the kindly presence of one who found the keenest enjoyments of his life in sharing his own possessions with his less fortunate neighbors.

HENRY P. WALCOTT,
WALTER HUNNEWELL, } *Committee.*

The decease of Samuel R. Payson, an Honorary Member of the Society, and that of Edwin W. Buswell, for many years Treasurer of the Society, was announced, and it was voted that the President appoint Committees to prepare memorials of these two members.

Adjourned.

BUSINESS MEETING.

SATURDAY, October 2, 1897.

A Stated Meeting of the Massachusetts Horticultural Society, being the Annual Meeting for the choice of Officers and Standing Committees, was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The Secretary stated that the meeting had been duly called agreeably to the Constitution and By-Laws.

Agreeably to the Constitution and By-Laws, the President appointed Hon. Aaron Low, James Comley, and J. W. Manning a Committee to receive, assort, and count the votes given, and report the number. The polls were opened at five minutes past eleven o'clock.

The President, as Chairman of the Executive Committee, made the following report:

At a regular meeting of the Executive Committee, held September 25, it was voted to recommend to the Society to transfer $30 of the appropriation for the Fruit Committee for 1896 to the account of the Flower Committee for the same year, to make up for a deficiency in the amount at the command of the latter.

The transfer was unanimously authorized.

The following memorial of Robert Douglas, drawn up by Charles S. Sargent, Chairman of a Committee appointed at the July meeting for that purpose, was read and unanimously adopted:

Robert Douglas was born at Gateshead, near Halifax, England, in 1813, and removed to Canada in 1836. Two years later he settled in Whitingham, Vt., where for a short time he kept the country inn, and in 1844 he made his home on the shores of Lake Michigan, about thirty miles north of Chicago, in what is now the city of Waukegan. Here, a few years later, having been interested in the cultivation of plants since he was a boy, when he lived with his parents in Fallon's Nursery, near Newcastle, he established a small nursery business and found his true occupation; and here, during the remainder of his life, he devoted himself to raising conifer and other tree seedlings, of which he has distributed millions through the country. More recently Mr. Douglas made, under contract, successful plantations of forest trees in the western prairies, and in his time no one has been more active in increasing the love of planting trees in this country, or has studied trees from a cultural point of view with greater zeal, intelligence, or success. The integrity and purity of the life of Robert Douglas, his total lack of self-seeking, and his unfailing cheerfulness commanded the respect and affection of all who knew him.

CHARLES S. SARGENT,
J. W. MANNING,
JAMES H. BOWDITCH,
} *Committee.*

The Secretary read a letter from Joseph S. Fay, Jr., acknowledging, in behalf of his family, the memorial of his father adopted at the last meeting of the Society, and thanking the Society for it.

The following vote, offered by Hon. Aaron Low, was unanimously passed:

Voted, That the several committees be required to hold official meetings to arrange a list of prizes to be presented to the Committee on Establishing Prizes to be offered by the Society.

The Committee provided for at the last meeting of the Society to prepare a memorial of the late Samuel R. Payson was announced by the President as follows: Benjamin C. Clark, William H. Spooner, and Walter Hunnewell.

And the Committee to prepare a memorial of Edwin W. Buswell as follows: E. W. Wood, Samuel Hartwell, and George E. Davenport.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

WILLIAM H. BURLEN, of Boston,
WILLIAM J. KENNEDY, of Brighton,
MARCELLUS A. PATTEN, of Tewksbury,
EDWARD A. WILKIE, of Newtonville,
GEORGE E. FRANCIS, M.D., of Worcester,
ARTHUR F. ESTABROOK, of Boston,
JAMES O. HALE, of Byfield,
WILLIAM S. BRIGGS, of Lincoln,
Mrs. F. A. (SARAH C.) PIERCE, of Brookline,
ISAAC SPRAGUE, of Wellesley Hills.

The polls were closed at five minutes past one o'clock, and the Committee to receive, assort, and count the number given reported the whole number of ballots cast to be fifty-five, and that the members named on the ticket reported by the Nominating Committee had a plurality of votes and were elected.

The report of the Committee was accepted, and the persons named on the above mentioned ticket were, agreeably to the Constitution and By-Laws, declared by the Chairman, O. B. Hadwen (the President having retired and called Mr. Hadwen to the chair) to have a plurality of votes, and to be elected Officers and Standing Committees of the Society for the year 1898.

Adjourned to Saturday, November 6.

BUSINESS MEETING.

SATURDAY, November 6, 1897.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following memorial of Samuel R. Payson was read by Benjamin C. Clark, Chairman of the Committee appointed at the meeting on Saturday, September 4, to prepare an expression of the feelings of the Society on his death:

SAMUEL R. PAYSON.

The Massachusetts Horticultural Society desires to place upon its records a deep-felt expression of its sense of loss in the decease of Mr. Samuel R. Payson, one of its oldest, most useful, and most honored members.

Mr. Payson was a many sided man, a most eminent and public spirited Boston merchant, and a true Christian gentleman. His leading characteristics were thoroughness, capacity, benevolence, and integrity. Familiar to an unusual degree with all his vast collection of fruits and plants, it was his pleasure conscientiously and generously to share with the public his enjoyment of them.

When called upon to bear heavy pecuniary losses through the fault of others, he patiently submitted, and disaster only seemed, in his case, to prove a stimulus to efforts which ultimately resulted in the full discharge of every obligation.

Faithful in the discharge of every duty, diligent in business, combining great sagacity with incorruptible integrity and an uprightness which never wavered, aiding always in promoting the aims and objects of our Society, he has gone to his rest in the fulness of years, leaving a memory which will be most cherished by those who knew him best and longest.

BENJ. C. CLARK,
WM. H. SPOONER,
WALTER HUNNEWELL, } *Committee.*

The memorial was unanimously adopted.

The President, as Chairman of the Executive Committee, reported from that Committee a recommendation that the Society appropriate the following named sums for Prizes and Gratuities

for the year 1898, the total being the same as the present year, viz.:

For Prizes and Gratuities:	
For Plants	$2,000
" Flowers	2,668
" Fruits	1,732
" Vegetables	1,200
" Gardens	500
Total for Prizes and Gratuities for the year 1898	$8,100

The report was accepted, and, agreeably to the Constitution and By-Laws, was laid over until the first Saturday in January.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

EDWARD O. ORPET, of South Lancaster,
EDWARD D. BLAKE, of Boston,
HERBERT DUMARESQ, of Chestnut Hill.

Adjourned to Saturday, December 4.

BUSINESS MEETING.

SATURDAY, December 4, 1897.

An adjourned meeting of the Society was holden today at eleven o'clock. Neither the President nor either of the Vice-Presidents being present, the meeting was called to order by the Secretary, and SAMUEL HARTWELL was unanimously elected Chairman *pro tem.*

E. W. Wood, Chairman of the Committee appointed at the October meeting to prepare a memorial of Edwin W. Buswell, presented the following:

Every year the Society is called to record the death of members who have been active in promoting its interests, and the present year has proved no exception.

Edwin William Buswell was born April 25, 1813, and died

August 5, 1897. He held for a number of years important offices of the Society, and discharged his duties in an efficient and acceptable manner. He was passionately fond of flowers, and previously to his connection with the Society, while engaged in mercantile pursuits, he devoted his leisure hours to their cultivation.

He was elected a member of the Society in 1856. He was elected a member of the Flower Committee from 1861 to 1866, serving two years as Chairman. In August, 1866, he was elected Treasurer of the Society, and he also discharged the duties of Librarian and Corresponding Secretary. In these positions he found a congenial field of labor. Not only members of the Society, but strangers visiting the Library seeking information, were pleasantly entertained and assisted in securing the information desired. He continued in the faithful discharge of his various duties until he tendered his resignation, June 2, 1881. He then removed to Brooklyn, N.Y., where he continued to reside until his death. He spent much of his time with his horticultural friends in the vicinity, many of whom expressed surprise at the extent and accuracy of his knowledge of the nomenclature of the plants in cultivation.

Resolved, That in the death of Mr. Buswell the Society loses one among its oldest members, who spent the best years of his life in its service.

Resolved, That this action of the Society be placed upon its records, and that a copy be sent to the family of the deceased.

E. W. Wood,
George E. Davenport,
Samuel Hartwell,
} *Committee.*

The memorial was unanimously accepted and adopted.

E. W. Wood, Chairman of the Fruit Committee, read the Annual Report of that Committee, which was accepted and referred to the Committee on Publication.

J. Woodward Manning, from the Committee on Establishing Prizes, reported the Schedule of Prizes for 1898 prepared by the Committee, and stated the principal changes from the Schedule of the present year. The report was accepted, and the Schedule as reported was adopted as the Schedule of Prizes for 1898.

Mr. Manning also submitted the following further report:

It is the sense of the Committee on Establishing Prizes that there should be a Committee appointed annually for the purpose of awarding prizes and gratuities to exhibits of a strictly botanical character, such as Native Plants exhibits, such committee to have similar powers and to be guided by similar rules to those which now guide the Committee on School Gardens and Children's Herbariums, and to be allowed a separate appropriation.

After remarks by George E. Davenport, Robert Manning, J. H. Woodford, and J. Woodward Manning, on the importance which the work of the Committee on School Gardens, etc., has attained and the widespread interest which it has excited, and other points, the report was laid on the table.

On motion of Azell C. Bowditch, it was voted that the thanks of the Society be presented to Charles A. Read, Jr., for his kind and generous offer of Prizes for Orchard Houses, and that it be accepted.

The Librarian laid before the Society a copy of "A Traveller's Notes of a Tour through India, Malaysia, Japan, Corea, the Australian Colonies, and New Zealand during the Years 1891–1893," by James Herbert Veitch, F.L.S., F.R.H.S., printed for private circulation and presented by the author. It was voted that the thanks of the Society be presented to Mr. Veitch for this interesting and valuable addition to the Library.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

Edmund M. Wood, of Natick,
James W. Nelson, of Framingham,
Henry A. Wheeler, of Newtonville,
John Barr, of Wellesley,
George H. Morgan, of New York,
J. A. Pettigrew, of Jamaica Plain.

Adjourned to Saturday, December 18, 1897.

BUSINESS MEETING.

SATURDAY, December 18, 1897.

An adjourned meeting of the Society was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

On motion of Joseph H. Woodford, it was

Voted, That the Annual Reports of the several awarding committees, etc., be accepted and referred to the Committee on Publication, without reading.

The following named reports were then presented and so referred:

The Annual Report of the Committee on Plants, by Azell C. Bowditch, Chairman.

The Annual Report of the Committee on Flowers, by J. Woodward Manning, Chairman.

The Annual Report of the Committee on Vegetables, by Charles N. Brackett, Chairman.

The Annual Report of the Committee of Arrangements, by Joseph H. Woodford, Chairman.

The Annual Report of the Committee on the Library, by William E. Endicott, Chairman.

The Annual Report of the Secretary and Librarian, by Robert Manning, Secretary and Librarian.

The meeting was then dissolved.

REPORT

OF THE

COMMITTEE ON PLANTS,

FOR THE YEAR 1897.

By AZELL C. BOWDITCH, CHAIRMAN.

The exhibitions of plants during the past season have been fully equal, and in many respects superior, to those of the preceding year. They have attracted many new exhibitors, and the specimens offered have shown a marked improvement, especially in Orchids.

Many new plants have been brought to our notice which will be mentioned farther on. The public have taken a greater interest in the exhibitions through the season, as manifested by the increased attendance, the amateur and the beginner having a fine chance to study and compare varieties and acquire knowledge not otherwise attainable.

The display of Azaleas has not been as good as your Committee could have wished, but, by doing away with the restrictions on the size of the pots, we hope in the future to get exhibits more worthy of the premiums offered. James Wheeler has entered for the Prospective Prize a fine white Azalea, named Mrs. J. H. White, of which your Committee think favorably; if on further trial it should bear out its good points, it will be quite an acquisition.

The first prize exhibition was on January 9, when John L. Gardner, Mrs. B. P. Cheney, and others showed some fine plants of an improved strain of the Chinese Primula. Your Committee hope, by removing the restrictions as to the size of pots, to have the coming season much larger and finer plants.

John L. Gardner exhibited *Primula stellata* for the first time. Your Committee think this will prove a valuable acquisition, owing to its long keeping qualities; it lasts two or three weeks after being cut. It was awarded a First Class Certificate of Merit.

January 16. Eight varieties of Cypripedium were shown by Oakes Ames. Among them was C. Susan Ames, which was awarded Honorable Mention. Mr. Ames exhibited also a fine plant of *Scuticaria Steelii*, the shoestring Orchid. C. E. Richardson brought a plant of *Senecio Petasitis*.

January 23. J. S. Bailey showed plants of the semi-double Cyclamen. Your Committee do not think this will prove to be a very valuable acquisition, the petals being not well developed, but curly, and conveying the appearance of a badly shaped flower.

January 30. We had from William Wallace Lunt a seedling Cypripedium bearing his name, a beautiful specimen. J. H. Hemingway, gardener to F. E. Simpson, brought some fine Violets.

February 6. From George McWilliam came two seedling Cymbidiums, having *eburneum* and *Lowianum* as parents, for which a First Class Certificate of Merit was awarded. He also exhibited four seedling Cypripediums. Mr. McWilliam has been a close student, and has met with marked success in hybridizing, as the above mentioned seedlings testify. Mrs. J. C. Whiton sent two baskets of *Dendrobium nobile*. J. E. Rothwell showed five varieties of Cypripediums, and John L. Gardner two plants of Sophronitis.

SPRING EXHIBITION.

March 23, 24, 25, and 26.

The Spring Exhibition tested the capacity of our halls, and certainly there has never been a finer display of bulbous plants. Among the larger contributors were the Bussey Institution, Dr. C. G. Weld, John L. Gardner, J. W. Howard, and Warren Ewell & Son. The prizes have been somewhat altered, as will be seen by referring to the Schedule for 1898.

May 15. R. & J. Farquhar exhibited a new bedding Begonia, *B. erecta compacta multiflora*, which in the opinion of your Committee will prove worthy of cultivation. J. E. Rothwell showed a fine plant of *Cypripedium bellatulum*, with ten flowers.

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 AND 23.

E. V. R. Thayer made a beautiful display of Orchids in variety, for which the first prize was awarded, W. P. Winsor taking the second. W. A. Manda, of South Orange, N. J., contributed a new hybrid Laelio-Cattleya, variety Superba, which was most remarkable for its brilliant coloring.

July 31. There came from the estate of Joseph S. Fay four very fine plants of *Hydrangea cyanoclada hortensia*, which for profusion of bloom and symmetry of plants have not been excelled.

August 21. J. E. Rothwell was awarded a Silver Medal for Cypripedium Frau Ida Brandt, the first time exhibited.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 1 AND 2.

The Annual Exhibition of Plants again demonstrated the fact that the Society has far outgrown the capacity of our halls. The collections of Greenhouse Plants were exceedingly fine and well grown. J. S. Bailey carried off the first prize, followed by John L. Gardner, N. T. Kidder, and Dr. C. G. Weld. J. H. White had about twenty specimens of Fuchsias, for which the first prize was awarded. William Donald had a superb plant of *Alocasia Sanderiana;* he was awarded a Silver Medal for its superior cultivation.

CHRYSANTHEMUM EXHIBITION.

NOVEMBER 2, 3, 4, AND 5.

The Plant Department of the Chrysanthemum Exhibition the past season had not as many contributors as in former years, but excelled all previous efforts in quality; the plants had a more even look, but would have been much finer could the exhibition have taken place one week later. The Committee have made some changes in the Schedule for the coming year which they hope will induce more growers to compete, and thus add to the appearance of the exhibition. Among the larger contributors, N. T. Kidder was first and Mrs. B. P. Cheney a close second, followed by J. S. Bailey and others.

J. S. Bailey also contributed a fine collection of Orchids.

December 4. F. L. Harris, gardener to H. H. Hunnewell, exhibited a fine plant of Begonia Gloire de Lorraine, for which a Silver Medal was awarded. Too much cannot be said of this beautiful plant; as a house plant it will prove a valuable acquisition, being in flower nearly all the time. Its culture will certainly well repay any one who has a love for house plants.

On this day, and also on the eleventh, Hon. C. G. Roebling, of Trenton, N.J., exhibited some fine specimens of Cypripediums, especially *C. Leeanum Clinkaberryanum*, a garden variety, which was quite distinct and beautifully marked. A Silver Medal was awarded for each of these exhibits.

Amount appropriated		$2,000 00
Awarded in Premiums and Gratuities .	$1,811 00	
Thirteen Silver Medals	65 00	
		1,876 00
Balance unexpended		$124 00

All of which is respectfully submitted.

A. C. Bowditch,
A. H. Fewkes,
James Comley,
William J. Martin,
} *Committee on Plants.*

PRIZES AND GRATUITIES AWARDED FOR PLANTS.

1897.

JANUARY 9.

CHINESE PRIMROSES. — Six plants, in six-inch pots, John L. Gardner,	$5 00
Second, Mrs. Benjamin P. Cheney	4 00
Third, Mrs. Benjamin P. Cheney	3 00
Gratuity: —	
John L. Gardner, Display of Orchids	5 00

JANUARY 16.

Gratuity: —	
Charles E. Richardson, *Senecio Petasitis*	2 00

FEBRUARY 6.

FREESIAS. — Six pots or pans, Bussey Institution	5 00
Gratuities: —	
Mrs. J. C. Whiton, two baskets of Dendrobiums	3 00
James E. Rothwell, Cypripediums	1 00
John L. Gardner, Sophronitis	1 00

MARCH 13.

Gratuity: —	
James Comley, Large Azalea	5 00

SPRING EXHIBITION.

MARCH 23, 24, 25, AND 26.

Theodore Lyman Fund.

INDIAN AZALEAS. — Four distinct named varieties in not exceeding ten-inch pots, Dr. C. G. Weld	12 00
Second, Bussey Institution	10 00
Two distinct named varieties in not exceeding ten-inch pots, Dr. C. G. Weld	6 00
Second, Bussey Institution	4 00
Specimen Plant, named, Dr. C. G. Weld	10 00
Second, Bussey Institution	8 00
Third, James Comley	5 00

Society's Prizes.

ORCHIDS. — Three plants, John L. Gardner	10 00
HARDY ORCHIDS. — Collection in pots or pans, forced, not less than four species, John L. Gardner	6 00
STOVE OR GREENHOUSE PLANTS. — Specimen in bloom other than Azalea or Orchid, Dr. C. G. Weld	8 00
Second, J. W. Howard	6 00

HARD-WOODED GREENHOUSE PLANTS. — Four, in bloom, Dr. C. G. Weld $10 00
Second, Dr. C. G. Weld 8 00
HYBRID PERPETUAL ROSES. — Forced, six plants, not less than three distinct varieties, Charles H. Souther 10 00
Second, James Comley 8 00
CLIMBING ROSE, CRIMSON RAMBLER. — Specimen plant, in bloom, Jackson Dawson 8 00
Second, Charles J. Dawson 6 00
HARDY FLOWERING DECIDUOUS SHRUBS, FORCED. — Four, of four distinct species, named, Bussey Institution 6 00
Second, Bussey Institution 4 00
HARDY FLOWERING EVERGREEN SHRUBS, FORCED. — Four, of four distinct species, named, Bussey Institution 6 00
CANNAS. — Display in pots, the second prize to James L. Little . 8 00
HARDY PRIMROSES AND POLYANTHUSES. — Twelve plants of distinct varieties, John L. Gardner 8 00
Second, John L. Gardner 6 00
Third, James L. Little 4 00
AURICULAS. — Six, in pots, Dr. C. G. Weld 6 00
CYCLAMENS. — Ten plants, Mrs. Benjamin P. Cheney . . . 15 00
Second, Mrs. Benjamin P. Cheney 12 00
Third, Nathaniel T. Kidder 10 00
Fourth, George M. Anderson 8 00
Ten plants, in not over seven-inch pots, Mrs. Benjamin P. Cheney, 8 00
Second, Nathaniel T. Kidder 6 00
Third, Mrs. Benjamin P. Cheney 4 00
Single plant, E. S. Converse 5 00
Second, Nathaniel T. Kidder 4 00
Third, Mrs. Benjamin P. Cheney 3 00
CINERARIAS. — Six varieties, Jason S. Bailey 10 00
Second, George M. Anderson 8 00
Third, John L. Gardner 6 00
Fourth, Dr. C. G. Weld 5 00
Three varieties, Jason S. Bailey 6 00
Second, George M. Anderson 5 00
Third, E. S. Converse 4 00
Single plant, Jason S. Bailey 4 00
Second, H. H. Rogers 3 00
Third, H. H. Rogers 2 00
HYACINTHS. — Twelve distinct named varieties in pots, one in each pot, John L. Gardner 8 00
Second, Bussey Institution 6 00
Third, Dr. C. G. Weld 4 00
Six distinct named varieties in pots, one in each pot, Dr. C. G. Weld 5 00
Second, Bussey Institution 4 00
Third, E. S. Converse 3 00

Three distinct named varieties in pots, one in each pot, Dr. C. G. Weld	$3 00
Second, Bussey Institution	2 00
Third, J. W. Howard	1 00
Single named bulb, in pot, Bussey Institution	2 00
Second, John L. Gardner	1 00
Three pans not to exceed twelve inches, ten bulbs of one variety in each pan, Dr. C. G. Weld	8 00
Second, Bussey Institution	6 00
Third, John L. Gardner	4 00
Two pans not to exceed twelve inches, ten bulbs of one variety in each pan, John L. Gardner	6 00
Second, Bussey Institution	4 00
Third, Dr. C. G. Weld	3 00
Single pan not to exceed twelve inches, ten bulbs of one variety, Dr. C. G. Weld	4 00
Second, John L. Gardner	3 00
Third, Bussey Institution	2 00
TULIPS. — Six eight-inch pans, nine bulbs of one variety in each, W. S. Ewell & Son	4 00
Second, Dr. C. G. Weld	3 00
Third, W. S. Ewell & Son	2 00
Three eight-inch pans, nine bulbs of one variety in each, W. S. Ewell & Son	3 00
Second, Bussey Institution	2 00
Third, Bussey Institution	1 00
Three ten-inch pans, twelve bulbs of one variety in each, Dr. C. G. Weld	5 00
Second, Dr. C. G. Weld	4 00
Third, James L. Little	3 00
Fourth, Bussey Institution	2 00
POLYANTHUS NARCISSUS. — Four seven-inch pots, five bulbs in each, distinct varieties, Dr. C. G. Weld	6 00
Second, Dr. C. G. Weld	4 00
Third, Bussey Institution	3 00
JONQUILS. — Six pots or pans, not exceeding eight inches, the number of bulbs in each to be at the discretion of the grower, W. S. Ewell & Son	4 00
Second, W. S. Ewell & Son	3 00
Third, Bussey Institution	2 00
NARCISSUSES. — Six eight-inch pans, distinct varieties, single or double, Dr. C. G. Weld	5 00
Second, W. S. Ewell & Son	4 00
Three eight-inch pans, W. S. Ewell & Son	4 00
Second, Dr. C. G. Weld	3 00
LILIUM LONGIFLORUM. — Six pots, not exceeding ten inches, J. W. Howard	10 00

LILIUM HARRISII. — Six pots, not exceeding ten inches, Dr. C. G. Weld $10 00
Second, J. W. Howard 8 00
LILY OF THE VALLEY. — Six pots, not exceeding seven inches, Bussey Institution 4 00
Second, Bussey Institution 3 00
Third, W. S. Ewell & Son 2 00
ANEMONES. — Three pots or pans, Bussey Institution . . . 3 00
FREESIAS. — Six pots or pans, James L. Little 4 00
Second, Dr. C. G. Weld 3 00
Third, Bussey Institution 2 00
IXIAS AND TRITONIAS. — Six pots or pans in varieties, Dr. C. G. Weld 4 00
Second, Dr. C. G. Weld 3 00
ROMAN HYACINTHS. — Six eight-inch pans, ten bulbs in a pan, W. S. Ewell & Son 4 00
Second, W. S. Ewell & Son 3 00
Third, Dr. C. G. Weld 2 00
GENERAL DISPLAY OF SPRING BULBS. — All classes, Bussey Institution 15 00
Second, J. W. Howard 12 00
Third, W. S. Ewell & Son 10 00

Gratuities: —

James Comley, Display of Azaleas 5 00
Bussey Institution, " " 3 00
George M. Anderson, Display of Cyclamens 5 00
H. H. Rogers, Display of Cyclamens and Cinerarias 6 00
W. S. Ewell & Son, Display of Crocuses 2 00

MAY EXHIBITION.

MAY 1.

PELARGONIUMS. — Six pots or pans of Ivy-Leaved, in bloom, the second prize to Dr. C. G. Weld 5 00
INDIAN AZALEAS. — Six plants, in pots, named, Dr. C. G. Weld . 15 00
Single specimen, Dr. C. G. Weld 5 00
Second, Dr. C. G. Weld 4 00
CALCEOLARIAS. — Six varieties in pots, Jason S. Bailey . . . 8 00
Second, Mrs Benjamin P. Cheney 7 00
Third, " " " 5 00
Fourth, " " " 4 00
Single plant, Jason S. Bailey 3 00
Second, Mrs. Benjamin P. Cheney 2 00
Third, " " 1 00
STREPTOCARPUSES. — Twelve in not exceeding six-inch pots, Mrs. Benjamin P. Cheney 3 00
Second, Mrs. Benjamin P. Cheney 2 00

Gratuities : —

Dr. C. G. Weld, Display of Seedling Amaryllises	$5 00
Dr. C. G. Weld, Boronias and Saintpaulia	3 00
Charles H. Souther, Calceolarias	3 00

MAY 15.

Gratuities : —

Walter Hunnewell, *Hydrangea Otaksa*	2 00
Edward J. Mitton, *Saxifraga sarmentosa*	1 00

MAY 22.

Gratuity : —

James Comley, *Cattleya Gaskelliana*	1 00

RHODODENDRON SHOW.

JUNE 3 AND 4.

Gratuities : —

William Wallace Lunt, *Cattleya Reineckiana*	1 00
John L. Gardner, Display of Orchids	10 00
Nathaniel T. Kidder, Display of Pelargoniums	6 00

ROSE EXHIBITION.

JUNE 22 AND 23.

ORCHIDS. — Six plants of six named varieties in bloom, E. V. R. Thayer	25 00
Second, W. P. Winsor	15 00
Three plants, John L. Gardner	15 00
Second, W. P. Winsor	10 00
Single specimen, Kenneth Finlayson	8 00
Second, John L. Gardner	6 00
TUBEROUS BEGONIAS. — Six pots of six varieties, Edward J. Mitton,	6 00

Gratuity : —

Nathaniel T. Kidder, Bougainvillea	5 00

JUNE 26.

Gratuity : —

E. S. Converse, *Begonia erecta*	4 00

JULY 10.

Gratuity : —

Jason S. Bailey, *Cœlogyne Massangeana*	2 00

JULY 17.

Gratuity : —

Mrs. Arthur W. Blake, Hydrangeas	10 00

JULY 24.

Gratuity : —

James E. Rothwell, Display of Orchids $4 00

JULY 31.

Gratuities : —

Estate of Joseph S. Fay, Hydrangeas 20 00
Nathaniel T. Kidder, *Aërides odorata* 5 00

AUGUST 21.

OUVIRANDRA FENESTRALIS. — E. S. Converse 8 00
Second, John L. Gardner 6 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 1 AND 2.

PALMS. — Pair in pots or tubs not more than twenty-four inches in diameter, Joseph H. White 12 00
Second, John L. Gardner 8 00
Pair in pots not more than fourteen inches in diameter, Dr. C. G. Weld 8 00
Second, Joseph H. White 6 00
GREENHOUSE PLANTS. — Collection containing foliage plants of all descriptions, not to exceed forty plants, in pots or tubs, Jason S. Bailey 40 00
Second, John L. Gardner 30 00
Six Greenhouse and Stove plants of different named varieties, two Crotons admissible, Nathaniel T. Kidder 25 00
Second, Dr. C. G. Weld 20 00
Third, John L. Gardner 15 00
Single plant for table decoration, in a twelve-inch pan or basket, dressed at the base with living plants only; only one entry admissible, the second prize to E. S. Converse . . . 6 00
Third, Charles H. Souther 4 00
SPECIMEN FLOWERING GREENHOUSE PLANT. — Single named variety, Charles H. Souther 8 00
Second, James L. Little 6 00
FUCHSIAS. — Six in not over ten-inch pots, Joseph H. White . . 12 00
Second, Charles H. Souther 10 00
FLOWERING PLANTS. — Any or all classes, group arranged for effect, Joseph H. White 15 00
ORNAMENTAL FOLIAGED PLANT. — Single specimen, named, not offered in any collection, Joseph H. White 5 00
Second, Dr. C. G. Weld 4 00
Third, Nathaniel T. Kidder 3 00
CALADIUMS. — Six named varieties, Nathaniel T. Kidder . . 6 00
Second, Dr. C. G. Weld 4 00

FERNS. — Six named varieties, no Adiantums admissible, Joseph H. White	$10 00
Third, Dr. C. G. Weld	6 00
Specimen other than Tree Fern, Joseph H. White	4 00
Second, E. S. Converse	3 00
ADIANTUMS. — Five named varieties, Joseph H. White	8 00
Second, Dr. C. G. Weld	5 00
Third, John Jeffries	4 00
LYCOPODS. — Four named varieties, Dr. C. G. Weld	5 00
DRACÆNAS. — Six named varieties, Dr. C. G. Weld	8 00
Second, Nathaniel T. Kidder	6 00
CROTONS. — Six named varieties in not less than eight-inch pots, Dr. C. G. Weld	10 00
CYCAD. — Single plant, named, James L. Little	10 00
Second, J. W. Howard	8 00
Third, John L. Gardner	6 00
ORCHIDS. — Three plants, named varieties, in bloom, the second prize to John L. Gardner	8 00
BEGONIA REX. — Six pots of six varieties, E. S. Converse	6 00
Second, James L. Little	4 00
BEGONIAS. — Rex Hybrids, collection, named, James L. Little	6 00
Second, W. S. Lincoln	4 00
CANNAS. — Collection of not less than ten named varieties, John Jeffries	10 00
Second, James L. Little	8 00
Third, J. W. Howard	6 00
Gratuities: —	
Oakes Ames, *Stanhopea grandiflora*	2 00
B. Muto, Collection of Japanese Trees and Plants	20 00
Robert Cameron, Display of Plants	40 00
Joseph H. White, " " "	5 00
Dr. C. G. Weld, " " "	3 00
Charles H. Souther, "	3 00

SEPTEMBER 18.

Gratuity: —	
John L. Gardner, Display	3 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 30 AND OCTOBER 1.

DECORATIVE PLANTS. — Display, not less than forty, not to exceed three feet in height, to be arranged by the Committee, William A. Bock	25 00
Second, John L. Gardner	20 00

Gratuity : —

E. S. Converse, Decorative Plants $20 00

OCTOBER 16.

Gratuities : —

John L. Gardner, Display of Orchids 6 00
James E. Rothwell, " " 4 00
Mrs. A. O. Simes, Wild Plants 1 00

OCTOBER 30.

James E. Rothwell, Display of Dendrobiums 2 00

CHRYSANTHEMUM SHOW.

NOVEMBER 2, 3, 4, AND 5.

CHRYSANTHEMUMS. — Display of twelve named plants, any or all classes, distinct varieties, Nathaniel T. Kidder . . . 50 00
Second, Mrs. Benjamin P. Cheney 40 00
Third, Jason S. Bailey 30 00
Three Japanese Incurved, Mrs. Benjamin P. Cheney . . . 10 00
Three Reflexed, Mrs. Benjamin P. Cheney 10 00
Second, Nathaniel T. Kidder 7 00
Specimen Incurved, Nathaniel T. Kidder 6 00
Second, Mrs. Benjamin P. Cheney 5 00
Third, Nathaniel T. Kidder 4 00
Specimen Reflexed, Mrs. Benjamin P. Cheney 6 00
Specimen Anemone Flowered, Nathaniel T. Kidder . . . 6 00
Second, Mrs. Benjamin P. Cheney 5 00
Third, Nathaniel T. Kidder 4 00
Specimen Pompon, Mrs. Benjamin P. Cheney 4 00
Second, Nathaniel T. Kidder 3 00
Third, Nathaniel T. Kidder 2 00
Twelve plants of twelve different varieties, grown to one stem and bloom, in not over six-inch pots, preference being given to plants not more than three feet in height, Mrs. Arthur W. Blake . 10 00
Second, Mrs. Arthur W. Blake 8 00
Third, James L. Little 6 00
Fourth, E. S. Converse 4 00
Six plants grown as above, but all of one color, red, James L. Little 5 00
Second, E. S. Converse 4 00
White, Dr. C. G. Weld 5 00
Second, James L. Little 4 00
Third, James Nicol 3 00
Pink, Dr. C. G. Weld 5 00
Second, Dr. C. G. Weld 4 00
Third, James L. Little 3 00

Yellow, Dr. C. G. Weld	$5 00
Second, Charles H. Souther	4 00
Third, James L. Little	3 00
Six of any other color, Dr. C. G. Weld	5 00
Second, Dr. C. G. Weld	4 00
Group of Chrysanthemums arranged for effect, limited to one hundred square feet, and edged with ferns or low-growing decorative plants, Mrs. Arthur W. Blake	40 00
Second, Dr. C. G. Weld	35 00
Third, John L. Gardner	30 00
Fourth, J. W. Howard	25 00
Fifth, E. S. Converse	20 00

Gratuities: —

F. E. Palmer, *Nephrolepis exaltata*	4 00
W. P. Winsor, *Cypripedium insigne*	1 00
Jason S. Bailey, Display of Orchids	10 00
Dr. C. G. Weld, Display of Plants	3 00

DECEMBER 4.

Gratuity: —

Hon. C. G. Roebling, Trenton, N.J., four varieties of Cypripediums, 3 00

SOCIETY'S SILVER MEDALS.

Spring Exhibition, March 23–26. Mrs. B P. Cheney, for Superior Cultivation of Cyclamens.

May 1. Kenneth Finlayson, for Seedling Amaryllis.

" " J. S. Bailey, for *Dendrobium nobile Baileyanum.*

May 15. J. E. Rothwell, for *Cypripedium bellatulum.*

Rose and Strawberry Exhibition, June 22 and 23. W. A. Manda, South Orange, N.J., for *Lælio-Cattleya Arnoldiana* var. *superba.*

" " " " " " J. E. Rothwell, for *Odontoglossum crispum* var. *virginale.*

" " " " " " John Mutch, for Superior Cultivation of Orchids.

July 3. J. E. Rothwell, for *Miltonia vexillaria.*

August 21. J. E. Rothwell, for Cypripedium Frau Ida Brandt.

Annual Exhibition of Plants and Flowers, Sept. 1 and 2. William Donald, for *Alocasia Sanderiana.*

" " " " " " J. E. Rothwell, for collection of Crotons.

November 20. W. W. Lunt, for *Cypripedium insigne* var. *Ernestii.*

December 4. F. L. Harris, for Begonia Gloire de Lorraine.

December 11. Hon. C. G. Roebling, Trenton, N.J., for *Cypripedium Leeanum Clinkaberryanum.*

FIRST CLASS CERTIFICATES OF MERIT.

January 9. John L. Gardner, for *Primula stellata.*

February 6. George McWilliam, for Two Seedling Cymbidiums.

April 10. J. E. Rothwell, for *Cypripedium bellatulum.*

April 10. James Wheeler, for Seedling Azalea Mrs. Joseph H. White.

May 1. Donald McRea, for Superior Cultivation of *Mimulus* (*Diplacus*) *glutinosus.*

July 31. J. E. Rothwell, for *Cypripedium Corningii.*

Annual Exhibition of Plants and Flowers, Sept. 1 and 2. Dr. C. G. Weld, for *Heliconia illustris rubicolus.*

December 4. Hon. C. G. Roebling, Trenton, N.J., for *Cypripedium Niobe superbissima.*

HONORABLE MENTION.

January 16. Oakes Ames, for Display of Cypripediums.

Spring Exhibition, March 23–26. W. A. Manda, South Orange, N.J., for New Foliage Canna.

May 15. R. & J. Farquhar & Co., for New Bedding Begonia, *Begonia erecta compacta multiflora.*

July 3. W. E. Coburn, for Pelargonium Dorothy.

Annual Exhibition of Plants and Flowers, September 1 and 2. J. E. Rothwell, for Collection of Orchids.

REPORT

OF THE

COMMITTEE ON FLOWERS,

FOR THE YEAR 1897.

By J. WOODWARD MANNING, CHAIRMAN.

Your Committee beg leave to make the following report:

The season of 1897 has brought forth a larger number of exhibitions than in the past, and has been remarkable in many respects for the quantity and quality of the flowers exhibited. The Lower Hall has been taxed to its utmost capacity on nearly every occasion when prizes have been offered for important classes of flowers. While the abnormally cool weather conditions of the early part of the summer retarded the development of the flowers, abundant later rains produced, on the whole, a greater quantity and better quality of flowers than in the past; yet in some classes this served to develop diseases to an unusual degree, this being especially true of Hollyhocks, which, presumably for this cause, were shown in scanty numbers.

Your Committee have found it necessary, in view of the continued increase of exhibits other than those for which regular prizes are scheduled, to reduce very materially the gratuities that have in the past been awarded for such outside exhibits. This experience has made it evident that it will be necessary to reduce even to a larger extent the amount of such gratuities; in fact, it seems almost necessary to award Certificates in the place of money prizes in the near future, unless a larger appropriation can be arranged.

The exhibits of Native Plants have increased in number and have taxed the capacity of the hall, especially when exhibited in

connection with the strictly horticultural exhibitions. For that reason your Committee deem it wise that special space be granted such native plant exhibits, and would suggest the use of the Upper Hall on all days when they would not interfere with business meetings or other uses. These exhibits have created a great deal of interest and form a very significant feature of the exhibitions to a large portion of the visiting public. Extension in this line would be desirable, and your Committee feel that it would be no more than right that the exhibitors should be given ample space in which to display their collections. While your Committee, with the addition of a botanical expert to its number, have found less difficulty in making awards the past season, still they deem it wise that a Special Committee should be appointed to judge the Native Plant exhibits. They being of a strictly botanical nature, it would seem that a Committee composed exclusively of botanists would be better able to judge of the comparative rarity and educational value of the exhibits than would a Committee composed chiefly of horticulturists. For that reason we would recommend that a Special Committee, working on such lines as do the present Committee on School Gardens and Children's Herbariums, be appointed with the same powers and privileges, and that a special appropriation be set aside for their use in awarding such prizes as may be scheduled and such gratuities as they may deem wise.

On January 16 Kenneth Finlayson, gardener to Dr. C. G. Weld, made a very creditable exhibition of Hippeastrums, *Erica Wilmoreana*, *Streptosolen speciosum major*, *S. Jamesonii*, *Epacris hyacinthiflora*, *Phalœnopsis Schilleriana*, and *Centropogon Lucyanus*. On the same day, Hugh Graham, of Philadelphia, Pa., exhibited a new Carnation, Victor, for which your Committee awarded Honorable Mention.

The following Saturday, January 23, H. A. Cook exhibited the new Carnation Nivea, for which a First Class Certificate of Merit was awarded.

The exhibition of Orchids on February 6 called forth a close competition, and was very creditable to the exhibitors.

February 20 *Hemerocallis aurantiaca major* was exhibited by Jacob W. Manning as a new hardy Japanese Hemerocallis or Day Lily, and received a First Class Certificate of Merit.

SPRING EXHIBITION.

March 23, 24, 25, and 26.

At this exhibition the competition for most of the prizes offered for Roses was close; the quality of the specimens has never been surpassed, and the display was in all respects extremely satisfactory. Carnations also were shown in unusual quantity and of the best quality, while Violets were shown in great abundance and perfection. James Comley exhibited a forced branch of a new variety of Japanese Flowering Cherry which was of remarkable character in its abundance of very double, pure white, pendulous flowers, hanging in clusters the length of the branch. This was very unique and was awarded a Silver Medal.

MAY EXHIBITION.

May 1.

Pansies, Narcissuses, and Tulips were at this time shown in abundance and made a most creditable display. Native Plants were first entered at this time and continued at intervals for the remainder of the year.

May 22, Carl Jurgens, of Newport, R.I., exhibited forced flowers of *Convallaria prolificans*, which attracted a great deal of attention, and for their very apparent value were awarded a Silver Medal by the Committee. At the same exhibition the Miellez Horticultural Company exhibited two vases of Lily of the Valley, which, for their superior culture, were awarded a First Class Certificate of Merit.

RHODODENDRON SHOW.

June 3 and 4.

Although the weather conditions up to this date had not been propitious, the show of Rhododendrons and Azaleas was very fine and the quality of the flowers seemed fully up to that of previous years. At this time Oriental Poppies, German Irises, and Aquilegias were shown in quantity and great variety, and of fine quality. T. C. Thurlow made a very creditable exhibit of named Hardy Trees and Shrubs, among which particular mention should be made of *Cornus florida* var. *rubra* and a choice variety of Mag-

nolias. One of the most attractive features of this exhibition was a collection of Orchids by Henry T. Clinkaberry, gardener to Hon. C. G. Roebling, of Trenton, N.J. This exhibit attracted a great deal of attention, and for its great diversity and the unique character of many of the individual flowers was deemed worthy of the Appleton Gold Medal. A First Class Certificate of Merit was also awarded the same exhibitor for the fine hybrid Orchid, Laelio-Cattleya C. G. Roebling. W. A. Manda, of South Orange, N.J., was also awarded a First Class Certificate of Merit for superior culture shown in a spike of *Laelia purpurata* var. *South Orangiensis*, and also for *Lilium longiflorum* var. *foliis alba marginata*. To James Comley, Honorable Mention was given for the new Hardy Rhododendron William Power Wilson, and a Silver Medal for the variety James Comley.

PÆONY SHOW.

JUNE 12.

In many respects this was the most remarkable exhibition of the year. The Hall was amply filled with flowers grown to the height of perfection and displayed to the best possible advantage. The beauty and development of the individual flowers gave evidence of the highest possible culture on the part of the exhibitors, while their wide range of color was full testimony to the great value of this absolutely hardy garden plant, and seemed to make manifest the immense popularity that must soon ensue for these flowers. The Kelway Silver Gilt Medal was gained by Kenneth Finlayson, gardener to Dr. C. G. Weld, while the Kelway Bronze Medal was awarded to T. C. Thurlow. A First Class Certificate of Merit was awarded to George Hollis, for the new Seedling Pæony George Washington.

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 AND 23.

The display of Roses was disappointing in many respects, owing to lack of fully developed flowers due to the cold weather and heavy rains that had occurred just previous to that date. The following Saturday, however, they were shown in ample quantity and of the highest quality.

June 22, Honorable Mention was given W. A. Manda, of South Orange, N.J., for *Lælia elegans Mandiana*, and a First Class Certificate of Merit was awarded the same person for two new Hybrid Roses, the first being a cross between *Rosa Wichuraiana* and Perle des Jardins; the second a cross between *Rosa Wichuraiana* and Madame Hoste. Both show great possibilities for future culture. A Silver Medal was awarded to M. H. Walsh for the White Rose Lilian Nordica, and on the following day a First Class Certificate of Merit was awarded to him for the new Rose Joseph S. Fay.

The display of Delphiniums on June 26 was the finest that has been made for several years past. The spikes were of perfect quality and showed great range of color. On this date Robert Cameron, gardener to the Botanic Garden of Harvard University, made a remarkable exhibit of Hardy Herbaceous Perennials, well worthy of a larger gratuity than your Committee, owing to the limited amount of the appropriation, felt able to award.

July 3, the display of Iris Kæmpferi did not compare favorably with exhibits of former years, while Shirley Poppies, English Irises, and *Lilium candidum* unfortunately had been seriously affected by bad weather and other unfavorable conditions, and were not shown at all. The display of *Campanula Medium*, however, was undoubtedly the finest that has been made in the Hall. William Thatcher, gardener to John L. Gardner, is deserving of great praise for the high character of the spikes shown. T. C. Thurlow on this date exhibited *Rhus Cotinus atropurpureus*, which was especially distinct from other types in the deeper purplish effect of its sprays of seed vessels, and which your Committee deemed worthy of a First Class Certificate of Merit. On this date also, Walter H. Cowing exhibited *Rosa lucida alba*, a pure white and very fragrant variety of our ordinary *Rosa lucida*, and for this a First Class Certificate of Merit was awarded.

July 10, Hollyhocks were not exhibited, this being due, presumably, to the ravages of the Hollyhock disease, which seems to have made serious inroads upon all those collections which in the past have contributed so effectively to our exhibitions. On that day, James Wheeler, gardener to Joseph H. White, made a remarkable display of ninety varieties of Sweet Peas, all correctly named, and displayed in such a manner as to show the comparative difference as well as the merits of each particular variety. This

exhibit was most effective and elicited a great deal of praise. William Thatcher, gardener to John L. Gardner, exhibited a new seedling Delphinium, nearly pure white, for which Honorable Mention was awarded.

The postponement of the Hollyhock prizes until July 17 did not gain the exhibits hoped for, and none were deemed worthy of the first prize.

The exhibits of Sweet Peas on July 24 were ample and well shown, although weather conditions had been somewhat disadvantageous to individual flowers. However, distinct advancement in many of the newer sorts was evident, and the coming year will, with favorable weather conditions, undoubtedly assist in producing effective exhibits in this class. At this time, James Greene, gardener to James L. Little, exhibited flowers of *Begonia Haageana* which, for their abundance and unique character, were deemed worthy of a First Class Certificate of Merit. Robert Cameron, gardener to the Botanic Garden of Harvard University, displayed fruits of *Podophyllum Emodi*, whose unique character and ornamental effect gained for them a First Class Certificate of Merit. Hardy Perennial Phloxes were not shown to as good advantage this year as in the past, owing to abundant rains, which seriously interfered with the perfection of the panicles.

August 7, the display of Annuals resulted in very close competition. A large portion of the Hall was filled and the character of the exhibits was of the best. Unfortunately Gladioli were not shown to as good advantage this year as in the past. We hope another season may bring a change in this respect. *Montbretia crocosmiflora* was shown both by the Bussey Institution and Judge C. W. Hoitt, of Nashua, N.H., and made a very interesting exhibit. This class of Hardy Bulbs should be far more widely cultivated than in the past. Its brilliancy of color, abundance of bloom, and ease of culture are valuable characteristics.

AQUATIC EXHIBITION.

August 21.

This was held in the Upper Hall, several tanks being filled to repletion, and the exhibits commanded close attention from a large number of visitors. The same day the prizes for China Asters were closely competed for by a number of exhibitors, and decided

advancement was shown in the class. At this time a Silver Medal was awarded to Henry A. Dreer, of Philadelphia, Pa., for a remarkable collection of Cannas, among which the Canna Allemania was deemed worthy of a First Class Certificate of Merit. In addition, this gentleman exhibited the new pure white Gladiolus called White Lady, for which also a First Class Certificate of Merit was awarded, and a choice collection of double and fringed Petunias was given Honorable Mention, while Nymphæa Falconeri was allotted a First Class Certificate of Merit. Honorable Mention was given George Hollis for a sport of *Vallota purpurea*, which was quite distinct in color from the ordinary type, and of larger size.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

September 1 and 2.

Not for many years past has there been such an increase of exhibits of Dahlias as at this show. The quality of the blooms was indicative of careful culture on the part of the exhibitors, while the quantity was ample evidence of the esteem in which this flower is held by the public at the present time. This exhibition was in many respects a surprise. Although your Committee recognized the fact that the Dahlia is fast coming to the front again and regaining its past eminence, yet they regret to find the appropriation set aside for the special use of this class so comparatively small.

September 11, there was shown a pure white form of *Aster Novæ-Angliæ*, for which a First Class Certificate of Merit was awarded Robert Cameron, gardener at the Botanic Garden of Harvard University.

Robert Laurie, gardener to Cornelius Vanderbilt, of Newport, R.I., made a very creditable display of Fringed Tuberous Begonias. These obtained Honorable Mention.

September 18, a display of Perennial Asters called forth close competition, and the Hall was well filled. On this date also, a noteworthy collection of ornamental fruit and hardy trees was made by Jackson Dawson, Superintendent of the Arnold Arboretum.

The exhibition of Early Flowering Chrysanthemums scheduled under October 16 did not bring the competition that was expected, and although several creditable entries were made, your Committee regret that greater competition was not evident.

CHRYSANTHEMUM SHOW.

NOVEMBER 2, 3, 4, AND 5.

All things considered, this was undoubtedly the finest exhibition of Chrysanthemums ever made in our Halls. There were a greater number of entries, and the character of the flowers was seemingly perfect in all of the double blooming varieties. All the tables were closely filled, and the capacity of the Hall was taxed to its utmost. All exhibitors seemed to vie in giving their plants the highest culture. As a result, competition was extremely close and the general tone of the exhibition was immensely improved. The classes of twenty-five varieties were very closely competed for. The vases of cut blooms gave a remarkable effect upon entering the Hall, while nearly every scheduled prize was taken. As a result the surplus that would otherwise return to the Committee to help meet gratuities awarded during the year was very small, and in consequence your Committee find the appropriation nearly exhausted at the end of the year, and they cannot but reiterate the hope that a larger appropriation can be spared by the Society for the use of the Flower Committee, feeling as they do that this would enable them to award gratuities to exhibitors more nearly in proportion to the value of their exhibits. At this show, Arthur Griffin, gardener to J. J. Van Alen, of Newport, R.I., exhibited an improved strain of seedling *Begonia semperflorens* in which a great range of color was apparent. For this a Silver Medal was given.

M. H. Walsh has entered his new seedling Rose, Lilian Nordica, for the Prospective Prize.

The amount appropriated for the year 1897 was .	$2,600 00
Awards of prizes and gratuities have been made to the amount of	2,514 00
Leaving an unexpended balance of . . .	$86 00

All of which is respectfully submitted.

J. WOODWARD MANNING,
GEORGE E. DAVENPORT,
M. H. NORTON,
FREDERICK S. DAVIS,
Committee on Flowers.

PRIZES AND GRATUITIES AWARDED FOR FLOWERS.

1897.

January 2.

Gratuities : —

James Comley, Display $5 00
Mrs. E. M. Gill, " 1 00

January 9.

Chinese Primroses. — Display of fifty or more individual blooms,
Mrs. Benjamin P. Cheney 2 00
Second, I. E. Coburn 1 00

Gratuities : —

James Comley, Display of Camellias and Orchids 3 00
W. N. Craig, Vase of Cypripediums 2 00
W. N. Craig, Vase of *Freesia refracta* 1 00
Mrs. E. M. Gill, Vase of Flowers 1 00
Mrs. P. D. Richards, Display of Mosses and Ferns . . . 2 00

January 16.

Gratuities : —

Kenneth Finlayson, Display of Flowers 3 00
James Comley, Display of Camellias 2 00

January 23.

Gratuities : —

W. E. Coburn, cut blooms of Chinese Primulas 2 00
Mrs. E. M. Gill, Display of Flowers 1 00

January 30.

Gratuities : —

Oakes Ames, Display of Flowers 3 00
James Comley, " " " 1 00

February 6.

Orchids. — Display of named species and varieties, filling not less than twenty bottles, E. O. Orpet 15 00
Second, William Thatcher 10 00
Violets. — Best collection of varieties, fifty blooms of each in a bunch, Alexander McKay 4 00
Second, Nathaniel T. Kidder 3 00
Carnations. — Display of cut blooms, with foliage, not less than six varieties, William Nicholson 8 00

CAMELLIAS. — Display of named varieties, cut flowers with foliage, not less than twelve blooms, of not less than six varieties, James Comley $4 00
Second, James Comley 3 00

Gratuities: —
James Comley, Display of Flowers 3 00
Joseph J. Comley, two vases of Roses — Bride and Bridesmaid . 2 00
John L. Bird, Display of *Acacia pubescens* 1 00
Walter E. Coburn, Display of Chinese Primroses 1 00
Mrs. E. M. Gill, Display 1 00

FEBRUARY 13.

Gratuities: —
James Comley, Vase of *Cœlogyne cristata* 3 00
James Comley, Display of California Violets 1 00

FEBRUARY 20.

Gratuities: —
James Comley, Display 4 00
Oakes Ames, " 3 00
Mrs. E. M. Gill, " 1 00

FEBRUARY 27.

Gratuities: —
James Comley, Basket of Flowers and Display 3 00
Mrs. E. M. Gill, Display of Flowers 1 00

MARCH 6.

Gratuity: —
James Comley, Display 3 00

SPRING EXHIBITION.

MARCH 23, 24, 25, AND 26.

HYBRID PERPETUAL ROSES. — Twelve blooms, of not less than four distinct named varieties, David Nevins 12 00
Second, James Comley 10 00
Six blooms, not less than three named varieties, David Nevins . 6 00
Second, James Comley 5 00
Twelve blooms of Ulrich Brunner, David Nevins 10 00
TENDER ROSES IN VASES. — Twelve blooms of American Beauty, F. R. Pierson & Co., Tarrytown, N.Y. 15 00
Twenty-five blooms of Bridesmaid, William H. Elliott . . . 12 00
Second, Robert McGoram 10 00
Twenty-five blooms of Meteor, F. R. Pierson & Co. 12 00
Twenty-five blooms of Souvenir de Président Carnot, F. R. Pierson & Co. 12 00

Twenty-five blooms of The Bride, William H. Elliott	$12 00
Second, Robert McGoram	10 00
Twenty-five blooms of Papa Gontier, William H. Elliott	8 00
Second, William H. Elliott	6 00
Vase of fifty blooms, assorted varieties, David Nevins	20 00
CARNATIONS. — Vase of one hundred cut blooms with foliage, not less than six varieties, William Nicholson	10 00
Third, William H. Elliott	8 00
Twenty-five blooms of any named Crimson variety, William Nicholson	4 00
Twenty-five blooms of any named Dark Pink variety, William Nicholson for William Scott	4 00
Twenty-five blooms of any named Light Pink variety, William Nicholson for Daybreak	4 00
Second, Peter Fisher for Daybreak	3 00
Twenty-five blooms of any named Scarlet variety, William Nicholson for Hector	4 00
Twenty-five blooms of any named White variety, H. A. Cook for Nivea	4 00
Second, Peter Fisher for Freedom	3 00
Twenty-five blooms of any named Yellow variety, William Nicholson for Eldorado	4 00
VIOLETS. — Bunch of fifty blooms of California, David Nevins	3 00
Second, James Comley	2 00
Bunch of fifty blooms of Lady Hume Campbell, David Nevins	3 00
Second, Joseph H. White	2 00
Bunch of fifty blooms of Marie Louise, David Nevins	3 00
Second, Joseph H. White	2 00
Bunch of fifty blooms of any other variety, David Nevins for Farquhar	3 00
Second, David Nevins for Swanley White	2 00
ANTIRRHINUMS. — Display, not less than three distinct varieties, Mrs. E. M. Gill	4 00
Second, John Jeffries	2 00
CAMELLIAS. — Display of named varieties, cut flowers with foliage, not less than twenty-four blooms of not less than six varieties, Joseph H. White	4 00
Second, James Comley	3 00

Gratuities: —

David Nevins, Display of Hardy Perpetual Roses	20 00
William E. Doyle, " of Lady Hume Campbell Violets	2 00
Jason S. Bailey, " of Carnations	1 00
David Nevins, " of Orchids	1 00
James L. Little, " of Streptocarpus	1 00
James Comley, "	5 00
Mrs. E. M. Gill, "	2 00

APRIL 3.

Gratuities: —

James Comley, Display of Cut Flowers	$3 00
Mrs. E. M. Gill, " " " "	1 00

APRIL 10.

Gratuity: —

James Comley, Display of Azaleas	8 00

APRIL 17.

Gratuity: —

Mrs. P. D. Richards, Display of Native Plants	1 00

APRIL 24.

Gratuities: —

Mrs. P. D. Richards, Display of Native Plants	1 00
Miss Vivien May Norris, " " " "	1 00

MAY EXHIBITION.

MAY 1.

TULIPS. — Twenty-four blooms, distinct named varieties, Bussey Institution	4 00
Second, Kenneth Finlayson	2 00
HARDY NARCISSUSES. — Collection of not less than ten named varieties of blooms, Kenneth Finlayson	5 00
Second, Bussey Institution	4 00
Third, W. N. Craig	3 00
PANSIES. — Forty-eight blooms, not less than twenty-four varieties, Hon. Joseph S. Fay	4 00
Second, Hon. Joseph S. Fay	3 00
Third, Mrs. E. M. Gill	2 00
NATIVE PLANTS. — Collection of thirty bottles of named species and varieties, one bottle of each, Mrs. P. D. Richards	8 00
Second, Miss Genevieve Doran	6 00
Third, Mrs. Kate E. Parker	4 00

Gratuities: —

Bussey Institution, Display of Tulips	2 00
Hon. Joseph S. Fay, Display of Pansies	1 00
Rea Brothers, Display of Hardy Perennials	1 00
Kenneth Finlayson, Display	3 00
Mrs. E. M. Gill, "	3 00
James Comley, "	3 00
W. N. Craig, "	2 00
John Jeffries, "	1 00
Oakes Ames, "	1 00
Mrs. Kate E. Parker, Display of Native Plants	1 00

MAY 8.

Gratuities: —

James Comley, Flowering Shrubs	$3 00
Mrs. P. D. Richards, Native Plants	2 00

MAY 15.

Gratuities: —

Bussey Institution, Display of Late Tulips	3 00
Kenneth Finlayson, Tulips	2 00
Joseph S. Chase, "	1 00
James Comley, Collection	3 00
Mrs. E. M. Gill, Display	2 00
Mrs. P. D. Richards, Native Plants	3 00

MAY 22.

TREE PÆONIES. — Collection of Single and Double varieties, named, Thomas C. Thurlow	6 00
Second, James Comley	4 00
HERBACEOUS PLANTS. — Thirty bottles, Jacob W. Manning	8 00

Gratuities: —

Thomas C. Thurlow, Collection of Hardy Shrubs	5 00
Charles H. Souther, Gloxinias	2 00
Carl Jurgens, Lily of the Valley	2 00
Jacob W. Manning, Display	2 00
James Comley, "	2 00
Mrs. E. M. Gill, "	1 00
Mrs. P. D. Richards, Wild Flowers	2 00
Miss Eleanor Doran, " "	1 00
Miss Vivien May Norris, Collection of Plants	1 00

MAY 29.

Gratuities: —

H. H. Hunnewell, Display of Rhododendrons	25 00
Miss Vivien May Norris, Native Plants	2 00

RHODODENDRON EXHIBITION.

JUNE 3 AND 4.

H. H. Hunnewell Fund.

RHODODENDRONS. — Twelve distinct varieties of unquestioned hardiness, named, James Comley	20 00
Second, John L. Gardner	15 00
Six distinct varieties of unquestioned hardiness, named, Kenneth Finlayson	10 00
Second, Mrs. Arthur W. Blake	5 00
Eighteen Tender varieties, named, James Comley	10 00

Six Tender varieties, named, James Comley	$5 00
Second, John L. Gardner	4 00
Three Tender varieties, named, James Comley	4 00
Second, Kenneth Finlayson	3 00
HARDY AZALEAS, FROM ANY OR ALL CLASSES. — Fifteen varieties, one vase of each, James Comley	8 00
Second, Thomas C. Thurlow	5 00
Six varieties, one vase of each, John L. Gardner	3 00
Second, James Comley	2 00
Cluster of trusses of one variety, Thomas C. Thurlow	2 00
Second, John L. Gardner	1 00

Society's Prizes.

HERBACEOUS PÆONIES. — Collection of named varieties, the second prize to Thomas C. Thurlow	4 00
GERMAN IRISES. — Twelve distinct varieties, three spikes of each, John L. Gardner	3 00
Second, Walter H. Cowing	2 00
ORIENTAL POPPIES. — Collection, named, Walter H. Cowing	3 00
Second, W. N. Craig	2 00
AQUILEGIAS. — Collection, Frederick S. Davis	3 00
Second, Kenneth Finlayson	2 00
Third, Walter H. Cowing	1 00
HARDY ORNAMENTAL TREES AND SHRUBS. — Collection of not less than thirty species and varieties, named, cut blooms or foliage, Thomas C. Thurlow	8 00
NATIVE PLANTS. — Collection of thirty bottles of named species and varieties, one bottle of each, Mrs. P. D. Richards	8 00
Second, Mrs. Kate E. Parker	6 00
Third, Miss Genevieve Doran	4 00
VASE OF FLOWERS, Mrs. E. M. Gill	4 00

Gratuities: —

H. H. Hunnewell, Azaleas and Rhododendrons	30 00
James Comley, Rhododendrons, Azaleas, etc.	20 00
Mrs. Benjamin P. Cheney, Rhododendrons, etc.	8 00
Kenneth Finlayson, Rhododendrons, etc.	5 00
Thomas C. Thurlow, Display of Azaleas and Rhododendrons	3 00
W. A. Manda, Collection of Orchids	5 00
William Nicholson, Vase of Carnations	3 00
Bussey Institution, Tulips and Irises	1 00
John Jeffries, Display	3 00
Mrs. A. D. Wood, Display	2 00
W. N. Craig, "	2 00
Mrs. E. M. Gill, "	1 00

JUNE 12.

FOXGLOVES. — Twelve spikes, Kenneth Finlayson	$3 00
Second, W. N. Craig	2 00
Third, John L. Gardner	1 00
Gratuities: —	
James Comley, Rhododendrons, Azaleas, and other Shrubs, etc.	15 00
Hon. Joseph S. Fay, Flowering Shrubs	7 00
Thomas C. Thurlow, Pæonies and Shrubs	5 00
George Hollis, Pæonies	3 00
John L. Gardner, Pæonies	2 00
Joseph S. Chase, Vase of Pæonies	1 00
W. N. Craig, Display of Carnations and Pæonies	3 00
Thomas W. Dee, Late Flowering Tulips	2 00
Mrs. E. M. Gill, Display	3 00
Mrs. P. D. Richards, Native Plants	1 00

JUNE 19.

HERBACEOUS PÆONIES. — Collection of named varieties, Double, Kenneth Finlayson	12 00
Second, Thomas C. Thurlow	10 00
Third, George Hollis	8 00
Collection of named varieties, Single, Thomas C. Thurlow	6 00
Third, George Hollis	4 00
Specimen bloom, Kenneth Finlayson, for Blanche Neige	2 00
Second, Kenneth Finlayson, for Model of Perfection	1 00
Vase of blooms, on long stems, arranged for effect, Kenneth Finlayson	8 00
Second, M. H. Walsh	6 00
Gratuities: —	
M. H. Walsh, Display of Roses and Pæonies	6 00
Charles H. Souther, Display of Pæonies	1 00
Mrs. E. M. Gill, " " "	1 00
Mrs. E. M. Gill, " " Roses	1 00
James Comley, "	10 00
Thomas C. Thurlow, "	3 00
Mrs. A. A. Johnson, "	1 00
Miss C. M. Endicott, " " Alpine Plants	2 00

ROSE EXHIBITION.

JUNE 22 AND 23.

Special Prizes, Theodore Lyman Fund.

HARDY ROSES. — Twenty-four distinct named varieties, three of each variety, Estate of Joseph S. Fay	25 00

Second, Estate of Joseph S. Fay $20 00
Third, Miss Eleanor J. Clark, Pomfret Centre, Conn. . . 15 00

Society's Prizes.

Sixteen distinct named varieties, three of each variety, Kenneth Finlayson 15 00
Second, Estate of Joseph S. Fay 10 00
Twelve distinct named varieties, three of each, the second prize to the Estate of Joseph S. Fay 8 00
Six distinct named varieties, three of each, the second prize to the Estate of Joseph S. Fay 4 00
Third, Miss Eleanor J. Clark 2 00
Twenty-four distinct named varieties, one of each, the second prize to Miss Eleanor J. Clark 8 00
Third, Estate of Joseph S. Fay 6 00
Eighteen distinct named varieties, one of each, the second prize to the Estate of Joseph S. Fay 6 00
Third, Miss Eleanor J. Clark 4 00
Twelve distinct named varieties, one of each, Kenneth Finlayson . 6 00
Six distinct named varieties, one of each, W. N. Craig . . 4 00
Second, Estate of Joseph S. Fay 3 00
Third, Kenneth Finlayson 2 00
Twenty-four blooms of Mme. Gabriel Luizet, Miss Eleanor J. Clark 8 00
Second, Estate of Joseph S. Fay 6 00
Third, Kenneth Finlayson 4 00
Six blooms of John Hopper, the second prize to Kenneth Finlayson, 2 00
Six blooms of Marquise de Castellane, the second prize to Patrick Kane 2 00
Twelve blooms of any other variety, Kenneth Finlayson . . 4 00
Second, W. N. Craig 3 00
Best single bloom of a variety introduced since 1893, Miss Eleanor J. Clark 3 00
Moss Roses. — Six distinct named varieties, three clusters of each, John L. Gardner 3 00
Second, Estate of Joseph S. Fay 2 00
General Display. — One hundred bottles of Hardy Roses, buds admissible, W. N. Craig 10 00
Second, Kenneth Finlayson 9 00
Third, Mrs. E. M. Gill 8 00
Fourth, Miss Eleanor J. Clark 7 00
Fifth, Estate of Joseph S. Fay 6 00
Sixth, William H. Spooner 5 00
Sweet Williams. — Thirty spikes, not less than six distinct varieties, Bussey Institution 4 00
Second, W. N. Craig 3 00
Third, Miss Mary S. Walker 2 00
Fourth, Charles H. Souther 1 00

SPANISH IRISES. — Collection, named, the second prize to the Bussey Institution	$2 00
VASE OF FLOWERS. — Best arranged, in one of the Society's glass vases, the second prize to Miss Genevieve Doran	4 00

Gratuities : —

Miss Eleanor J. Clark, Display of General Jacqueminot Roses	8 00
William H. Spooner, Display of Roses	1 00
Thomas C. Thurlow, seventy-two varieties of Pæonies	7 00
Carl Blomberg, Hardy Flowers	2 00
Rea Brothers, Hardy Perennials and Tuberous Begonias	2 00
L. W. Goodell, two tubs of Aquatics	5 00
James Comley, Display	7 00
Patrick Kane, "	3 00
Mrs. E. M. Gill, "	3 00
Nathaniel T. Kidder, "	2 00
Estate of Joseph S. Fay, "	2 00
W. N. Craig, "	1 00
William C. Winter, "	1 00
Mrs. E. A. Wilkie, "	1 00
Mrs. P. D. Richards, Native Plants	2 00

JUNE 26.

HARDY ROSES. — Collection, named, not less than twenty-five varieties, filling fifty vases, Estate of Joseph S. Fay	15 00
Second, Estate of Joseph S. Fay	10 00
Third, Kenneth Finlayson	6 00
Fourth, Estate of Joseph S. Fay	4 00
SWEET WILLIAMS. — Auricula flowered, ten spikes of ten distinct varieties, the second prize to Carl Blomberg	2 00
DELPHINIUMS. — Collection of twenty spikes, not less than five varieties, John L. Gardner	5 00
Second, Kenneth Finlayson	4 00
HERBACEOUS PLANTS. — Thirty bottles, Nathaniel T. Kidder	8 00
Second, Jacob W. Manning	6 00
Third, Rea Brothers	4 00
VASE OF FLOWERS. — Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities : —

Robert Cameron, Hardy Herbaceous Plants	10 00
W. N. Craig, Display of Roses and Sweet Williams	3 00
Edwin Sheppard, Sweet Williams	2 00
Mrs. E. A. Wilkie, Vases of Roses	1 00
Thomas Kane, Roses	1 00
John Jeffries, Pæonies	1 00

Estate of Joseph S. Fay, Display	$6 00
Estate of Joseph S. Fay, "	6 00
James Comley, "	6 00
J. Eaton, Jr., "	3 00
Mrs. E. M. Gill, "	3 00

JULY 3.

IRIS KÆMPFERI. — Fifteen varieties, three of each, John L. Gardner,	6 00
Six varieties, three of each, Miss Mary S. Walker	4 00
Second, John L. Gardner	3 00
CAMPANULA MEDIUM. — Collection, not less than twelve bottles, John L. Gardner	3 00
Second, Bussey Institution	2 00

Gratuities: —

Estate of Joseph S. Fay, Roses	7 00
Estate of Joseph S. Fay, Sweet Williams	3 00
W. E. Coburn, Sweet Williams	1 00
John L. Gardner, Delphiniums	3 00
John L. Gardner, Iris Kæmpferi	2 00
John L. Gardner, Phlox Miss Lingard	1 00
Rea Brothers, Hardy Perennials	2 00
Thomas C. Thurlow, Pæonies, etc.	2 00
James Comley, Display	5 00
Mrs. E. M. Gill, "	3 00
Mrs. A. D. Wood, "	1 00
Mrs. P. D. Richards, Native Flowers	2 00

JULY 10.

HOLLYHOCKS. — Single, twelve spikes, the second prize to John L. Gardner	3 00
NATIVE PLANTS. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each, Mrs. P. D. Richards	8 00
Second, Misses Eleanor and Mollie Doran	6 00
Third, Miss Helen M. Noyes	4 00
VASE OF FLOWERS. — Best arranged, in one of the Society's glass vases, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities: —

Joseph H. White, Display of ninety varieties of Sweet Peas	5 00
John L. Gardner, Japanese Irises	3 00
John L. Gardner, Stocks	2 00
John L. Gardner, Display of Poppies	1 00
James Comley, Japanese Irises	2 00

William H. Spooner, Rose Bardon Job	$1 00
James Comley, Display	3 00
Rea Brothers, "	2 00
W. N. Craig, "	2 00

JULY 17.

HOLLYHOCKS. — Double, twelve blooms of twelve distinct colors, the third prize to the Estate of Joseph S. Fay	3 00
Double, six blooms, of six distinct colors, the second prize to the Estate of Joseph S. Fay	2 00
Third, Estate of Joseph S. Fay	1 00
GLOXINIAS. — Twelve vases, cut blooms, three in each vase, arranged with any foliage, Kenneth Finlayson	5 00
Second, Kenneth Finlayson	4 00
Third, James L. Little	3 00
TUBEROUS BEGONIAS. — Collection, arranged with their own foliage, James L. Little	4 00
Third, E. S. Converse	2 00
HARDY AQUATIC FLOWERS. — Collection, named, Carl Blomberg	10 00
HARDY FERNS. — Display of named species and varieties, Mrs. P. D. Richards	7 00
Second, Carl Blomberg	5 00
Gratuities: —	
John L. Gardner, Hardy Phlox	2 00
Rea Brothers, Hardy Perennials	1 00
Estate of Joseph S. Fay, Display	3 00
W. N. Craig, "	1 00
Mrs. E. M. Gill, "	1 00

JULY 24.

SWEET PEAS. — Display of named varieties, filling thirty vases, arranged with any foliage, Marshall B. Faxon	6 00
Second, Mrs. H. A. Jones	4 00
Display of named varieties in vases, six sprays in each vase, Joseph H. White	4 00
Second, E. A. Weeks	3 00
Third, Mrs. H. A. Jones	2 00
HERBACEOUS PLANTS. — Thirty bottles, Nathaniel T. Kidder	8 00
Second, Jacob W. Manning	6 00
Third, Carl Blomberg	4 00
VASE OF FLOWERS. — For table decoration, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00
Gratuities: —	
Marshall B. Faxon, Display of Sweet Peas	2 00
Botanic Garden of Harvard University, Hardy Perennials	8 00

John L. Gardner, Display	$3 00
James Comley, "	2 00
James L. Little, "	2 00
Mrs. A. D. Wood, "	1 00
Mrs. P. D. Richards, Native Plants	2 00
Misses Eleanor and Mollie Doran, Native Plants	1 00

JULY 31.

PERENNIAL PHLOXES. — Eighteen distinct named varieties, one spike of each, the second prize to John L. Gardner	5 00
ANTIRRHINUMS. — Display of thirty vases, three spikes in each, the second prize to John Jeffries	3 00
Third, Carl Blomberg	2 00
NATIVE FLOWERS. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each, Mrs. P. D. Richards	8 00
Second, Misses Eleanor and Mollie Doran	6 00
Third, Miss Genevieve Doran	4 00
Gratuities: —	
Marshall B. Faxon, Sweet Peas	2 00
Bussey Institution, *Montbretia crocosmiflora*	1 00
J. Warren Clark, Gladioli	1 00
John L. Gardner, Display	3 00
James Comley, "	3 00
Mrs. E. M. Gill, "	1 00
Rea Brothers, "	1 00
Carl Blomberg, Display of Native Plants	2 00
John Jeffries, Native Plants	1 00

AUGUST 7.

ANNUALS. — General display, named, filling not less than one hundred and fifty bottles, John L. Gardner	10 00
Second, Carl Blomberg	8 00
Third, Charles H. Souther	6 00
Gratuities: —	
J. Warren Clark, Gladioli	1 00
W. N. Craig, Display	2 00
James Comley, "	2 00

AUGUST 14.

GLADIOLI. — Ten named varieties, in spikes, the second prize to John Parker	2 00
Display of named and unnamed varieties, filling one hundred vases, arranged for effect, with any foliage, J. Warren Clark,	8 00

MONTBRETIA CROCOSMIFLORA. — Display in vases, Bussey Institution	$3 00
Second, Hon. C. W. Hoitt	2 00
Gratuities: —	
W. N. Craig, Display	3 00
John Jeffries, "	2 00
John L. Gardner, "	2 00
Estate of Joseph S. Fay, "	2 00
G. A. Oliver, "	2 00
John Parker, "	1 00
Mrs. E. M. Gill, "	1 00
William C. Winter, "	1 00
H. A. Wheeler, "	1 00
Mrs. P. D. Richards, Native Plants	1 00
The Misses Doran, " "	1 00

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

AUGUST 21.

Theodore Lyman Fund.

AQUATICS. — General display of Nymphæas, Nelumbiums, Sedges, Papyrus, and other aquatic plants, arranged for effect, to include not less than twenty-five blooms of Nymphæas, Henry A. Dreer, Philadelphia	50 00
Second, Oakes Ames	30 00
Display of twelve Nymphæas and Nelumbiums, named, Oakes Ames,	10 00
ASTERS. — Large flowered of all classes, fifty vases, not less than twelve varieties, three flowers in each vase, Joseph H. White,	6 00
Second, John L. Gardner	5 00
Third, Charles H. Souther	4 00
Truffaut's Pæony Flowered, thirty blooms, not less than twelve varieties, Joseph H. White	5 00
Second, H. A. Wheeler	3 00
Victoria Flowered, thirty blooms, not less than twelve varieties, Joseph H. White	5 00
Second, John Jeffries	3 00
Pompon, twenty-four cut plants, not less than six varieties, John L. Gardner	5 00
HERBACEOUS PLANTS. — Thirty bottles, Nathaniel T. Kidder	8 00
Second, Jacob W. Manning	6 00
Third, Oakes Ames	4 00
Gratuities: —	
Botanic Garden of Harvard University, Herbaceous Plants	10 00
John L. Gardner, Asters	1 00
Henry A. Dreer, Philadelphia, Phlox	1 00

George Hollis, Display	$2 00
Henry A. Dreer, "	1 00
Rea Brothers, "	1 00
John L. Gardner, "	1 00
Mrs. E. M. Gill, "	1 00
Mrs. P. D. Richards, Native Plants	1 00
Miss Helen M. Noyes, " "	1 00

AUGUST 28.

Gratuity: —

Botanic Garden of Harvard University, Display	3 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 1 AND 2.

DAHLIAS. — Show, twelve blooms, distinct named varieties, John Parker	4 00
Second, Lothrop & Higgins	3 00
Third, H. F. Burt	2 00
Fancy, twelve blooms, distinct named varieties, H. F. Burt	4 00
Cactus, twelve blooms, distinct named varieties, L. W. Snow	4 00
Second, H. F. Burt	3 00
Third, H. F. Burt	2 00
Liliputian, twelve blooms, distinct named varieties, Lothrop & Higgins	4 00
Second, Lothrop & Higgins	3 00
Third, L. W. Snow	2 00
Single, twelve blooms, distinct named varieties, John Endicott & Co.	4 00
Second, John Endicott & Co.	3 00
General Display, all classes admissible, one hundred or more bottles, H. F. Burt	10 00
Second, William C. Winter	8 00
Third, Lothrop & Higgins	6 00
LILIUM LANCIFOLIUM. — Collection of named varieties, Sumner Coolidge	4 00
TROPÆOLUMS. — Display with their own foliage, filling twenty-five vases, Kenneth Finlayson	4 00
Second, James L. Little	3 00
Third, John Jeffries	2 00
MARIGOLDS. — Display of French and African, filling twenty-five vases, John L. Gardner	3 00
Second, James Comley	2 00
DOUBLE ZINNIAS. — Twenty-five flowers, not less than six varieties, E. Sheppard & Son	4 00
Second, Oakes Ames	3 00
Third, Kenneth Finlayson	2 00

NATIVE PLANTS. — Collection, not exceeding forty bottles of named species and varieties, Misses Eleanor and Mollie Doran	$8 00
Second, Mrs. P. D. Richards	6 00
Third, Miss Helen M. Noyes	4 00
VASE OF FLOWERS. — For table decoration, on the last day of the exhibition, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00
Third, Mrs. E. M. Gill	2 00
Gratuities: —	
Oakes Ames, Aquatics	10 00
L. W. Goodell, "	7 00
N. B. Shaw, Nymphæa Devoniensis	2 00
James L. Little, Begonias	2 00
C. E. Richardson, Tuberous Begonias	1 00
A. Lummus, Dahlias	1 00
James Comley, Display	4 00
L. W. Goodell, "	2 00
Mrs. E. M. Gill, "	2 00
Mrs. J. A. Cain, "	1 00

SEPTEMBER 11.

HERBACEOUS PLANTS. — Thirty bottles, Nathaniel T. Kidder	8 00
Second, Oakes Ames	6 00
Gratuities: —	
John Endicott & Co., Dahlias	1 00
James Comley, Display	3 00
Mrs. E. M. Gill, "	1 00
Miss Helen M. Noyes, Native Plants	1 00

SEPTEMBER 18.

PERENNIAL ASTERS. — Display of Native or Introduced species and varieties, Misses Eleanor and Mollie Doran	5 00
Second, Mrs. P. D. Richards	4 00
Third, John L. Gardner	3 00
ORNAMENTAL FRUITED HARDY TREES AND SHRUBS. — Collection of cut branches, named, Jackson Dawson	8 00
Second, Jackson Dawson	6 00
Gratuities: —	
Walter E. Coburn, *Aster Novæ Angliæ*	1 00
James Anderson, Display	2 00
Mrs. E. M. Gill "	2 00

SEPTEMBER 25.

Gratuity: —	
Mrs. E. M. Gill, Display	1 00

OCTOBER 9.

Gratuities : —

H. A. Wheeler, Petunias	$1 00
Mrs. E. M. Gill, Display	1 00
Misses Eleanor and Mollie Doran, Display of Native Plants	2 00

OCTOBER 16.

CHRYSANTHEMUMS. — Six blooms, distinct named varieties, James L. Little	3 00
Second, Cornelius Vanderbilt, Newport, R.I.	2 00
Third, J. W. Howard	1 00
Ten blooms of one variety, long stemmed, in vase, Cornelius Vanderbilt	8 00
Second, Cornelius Vanderbilt	6 00
Third, J. W. Howard	4 00

Gratuities : —

J. W. Leach & Sons, Chrysanthemum Ivory	1 00
C. E. Richardson, Tuberous Begonias	1 00
James Comley, Display	2 00
Mrs. E. M. Gill, "	1 00

OCTOBER 23.

Gratuities : —

W. N. Craig, *Eucharis Amazonica*	2 00
" " " Chrysanthemums	1 00
H. A. Wheeler, "	1 00

OCTOBER 30.

Gratuity : —

Oakes Ames, Orchids	5 00

CHRYSANTHEMUM SHOW.

NOVEMBER 2, 3, 4, AND 5.

Special Prizes.

Josiah Bradlee Fund.

CHRYSANTHEMUMS. — Twenty-five blooms of twenty-five distinct named varieties, E. M. Wood & Co.	20 00
Second, Cornelius Vanderbilt, Newport, R.I.	15 00
Third, Mrs. Benjamin P. Cheney	10 00
Six vases of six named varieties, ten blooms each, E. M. Wood & Co.	30 00
Second, Mrs. Benjamin P. Cheney	25 00
Third, J. W. Howard	20 00

Society's Prizes.

Twelve cut blooms, Incurved, named, Joseph H. White	$8 00
Second, Charles H. Souther	6 00
Twelve cut blooms, Japanese, named, David Nevins	10 00
Second, Joseph H. White	6 00
Third, Nathaniel T. Kidder	4 00
Twelve cut blooms, Japanese Incurved, named, E. M. Wood & Co.	10 00
Second, Joseph H. White	6 00
Third, Mrs. Benjamin P. Cheney	4 00
Twelve cut blooms, Anemone, named, James L. Little	8 00
Second, James L. Little	6 00
Six cut blooms, Incurved, named, Joseph H. White	5 00
Second, Charles H. Souther	4 00
Third, Elijah A. Wood	2 00
Six cut blooms, Japanese, named, Charles H. Souther	6 00
Second, James L. Little	4 00
Six cut blooms, Japanese Incurved, named, Charles H. Souther	6 00
Second, James L. Little	4 00
Six cut blooms, Reflexed, named, Joseph H. White	6 00
Second, Charles H. Souther	4 00
Third, E. S. Converse	2 00
Six cut blooms, Anemone, named, E. S. Converse	5 00
Second, James L. Little	4 00
Third, J. W. Howard	2 00
Twelve sprays Pompons, not less than six named varieties, the third prize to J. W. Howard	1 00
Twelve best varieties, named, introductions of 1897, Kenneth Finlayson	8 00
Second, Mrs. Benjamin P. Cheney	6 00
Vase of ten blooms on long stems, Pink, named, C. Vanderbilt, for Interocean	10 00
Second, H. McKay Twombly, for Viviand Morel	8 00
Third, David Nevins, for Viviand Morel	6 00
Vase of ten blooms on long stems, Red, named, David Nevins, for John Shrimpton	10 00
Second, E. M. Wood & Co., for Edwin Molyneux	8 00
Third, Mrs. Benjamin P. Cheney, for John Shrimpton	6 00
Vase of ten blooms on long stems, White, named, H. McKay Twombly, for Frank Hardy	10 00
Second, E. M. Wood & Co., for Mrs. Jerome Jones	8 00
Third, Mrs. Benjamin P. Cheney, for Mutual Friend	6 00
Vase of ten blooms on long stems, Yellow, named, David Nevins, for Major Bonnafon	10 00
Second, E. M. Wood & Co., for Golden Wedding	8 00
Third, Hon. John Simpkins, for Modesto	6 00

Vase of blooms on long stems, any other color, named, H. McKay Twombly, for Silver Cloud	$10 00
Second, David Nevins, for Charles Davis	8 00
Third, Mrs. Benjamin P. Cheney, for Mrs. George West	6 00
Vase of blooms on long stems, arranged in the Society's large China vases, to be kept in good condition during the exhibition, E. M. Wood & Co.	20 00
Second, Hon. John Simpkins	18 00
Third, Miss Eleanor J. Clark	16 00
Fourth, Charles H. Souther	14 00
Fifth, David Nevins	12 00
Sixth, W. N. Craig	10 00
Seventh, J. W. Howard	8 00
Best Seedling, never disseminated, Yellow, six blooms, C. Vanderbilt, Newport, R.I., for Peter Kay	5 00
Best Seedling, never disseminated, Incurved, of any color, six blooms, Joseph H. White, for Mrs. Gertrude Brydon	5 00

Gratuities : —

Frank Jones, Display of Chrysanthemums	6 00
Mrs. E. M. Gill, Chrysanthemums	3 00
William Nicholson, Carnations and Chrysanthemums	4 00
Peter Fisher, Carnations	1 00
James Comley, Display	3 00

NOVEMBER 13.

Gratuity : —

Mrs. E. M. Gill, Chrysanthemums	1 00

SOCIETY'S SILVER MEDALS.

Spring Exhibition, March 23. James Comley, for a new variety of Japanese Flowering Cherry.

May 22. Carl Jurgens, Newport, R.I., for *Convallaria prolificans*.

Rhododendron Show, June 3. James Comley, for new hardy Rhododendron James Comley.

Rose Exhibition, June 22. M. H. Walsh, for Rose Lilian Nordica.

August 21. Henry A. Dreer, Philadelphia, for a Collection of new Cannas.

Chrysanthemum Show, November 2. J. J. Van Alen, for Hybrid *Begonia semperflorens*.

APPLETON GOLD MEDAL.

Rhododendron Show, June 3. Hon. C. G. Roebling, Trenton, N.J., for a Collection of Orchids.

APPLETON SILVER MEDAL.

December 31. N. T. Kidder, he having taken the greatest number of First Prizes for Hardy Herbaceous Perennials through the season.

" 31. Mrs. P. D. Richards, she having taken the greatest number of First Prizes for Native Plants through the season.

APPLETON BRONZE MEDAL.

December 31. Jacob W. Manning, he having taken the second greatest number of First Prizes for Hardy Herbaceous Perennials through the season.

" 31. Misses Eleanor and Mollie Doran, they having taken the second greatest number of First Prizes for Native Plants through the season.

KELWAY SILVER GILT MEDAL.

June 19. Kenneth Finlayson, for the best Collection of eighteen named varieties of *Pæonia albiflora*, single or double.

KELWAY BRONZE MEDAL.

June 19. T. C. Thurlow, for the second best Collection of eighteen named varieties of *Pæonia albiflora*, single or double.

FIRST CLASS CERTIFICATES OF MERIT.

January 23. H. A. Cook, for Carnation Nivea.

February 18. John N. May, Summit, N.J., for Carnation Lily Dean.

" 20. Jacob W. Manning, for *Hemerocallis aurantiaca major*.

April 24. F. A. Blake, Rochdale, for Seedling Carnation Bon Ton.

May 22. Miellez Horticultural Company, for Lily of the Valley.

Rhododendron Show, June 3. Hon. C. G. Roebling, Trenton, N.J., for Lælio-Cattleya C. G. Roebling.

" " " " W. A. Manda, South Orange, N.J., for *Lælia purpurata* var. *South Orangiensis*.

" " " " " " for *Lilium longiflorum foliis alba marginata*.

Pæony Exhibition, June 19. George Hollis, for Seedling Pæony George Washington.

Rose Exhibition, June 22. W. A. Manda, South Orange, N.J., for new Rose, a cross between Rosa Wichuraiana and Perle des Jardins.

" " " " " for new Rose, a cross between Rosa Wichuraiana and Madame Hoste.

" " " M. H. Walsh, for Rose Joseph S. Fay.

July 3. T. C. Thurlow, for *Rhus cotinus atropurpureus*.

" " W. H. Cowing, for *Rosa lucida alba*.

" 24. James L. Little, for *Begonia Haageana*.

" " Harvard Botanic Garden, for *Podophyllum Emodi*.

August 21. Henry A. Dreer, Philadelphia, for *Nymphæa Falconerii*.

" " " " " " for Canna Allemania.

" " " " " " for Gladiolus White Lady.

September 11. Robert Cameron, for *Aster Novæ Angliæ.*
October 30. I. E. Coburn, for a Collection of Pansies.
Chrysanthemum Show, November 2. Peter Fisher, for Carnation Mrs. T. W. Lawson.
" " " " Hugh Graham, Philadelphia, for Chrysanthemum Pennsylvania.

HONORABLE MENTION.

January 16. Hugh Graham, Philadelphia, for new Carnation Victor.
April 10. F. A. Blake, for new scarlet Seedling Carnation Bon Ton.
June 3. James Comley, for new hardy Rhododendron William Power Wilson.
" 22. W. A. Manda, South Orange, N.J., for *Lælia elegans Mandiana.*
July 10. John L. Gardner, for new Seedling Delphinium.
" 31. " " " for new Seedling Delphinium.
August 21. Henry A. Dreer, Philadelphia, for Double and Fringed Petunias.
" " George Hollis, for a sport of *Vallota purpurea.*
September 11. Cornelius Vanderbilt, Newport, R.I., for Fringed Tuberous Begonias.
Chrysanthemum Show, November 2. Joseph Hilbert, Nyack, N.Y., for a sport of Swainsonia.
" " " " A. Roper, for Carnation Mayor Quincy.

COMPLIMENTARY NOTICE.

February 6. A. Roper, for new Carnation Roper's Seedling.

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1897.

By E. W. WOOD, CHAIRMAN.

The fruit crop of the present year, as indicated by our exhibitions, was below the average of the last few years. While there was no absolute failure in any particular line of fruit, the natural conditions were unfavorable for the best results. There was less injury to the peach buds and to the strawberry, raspberry, and blackberry plants than usual, but the excessive amount of moisture and the limited amount of sunshine were unfavorable to the growth and maturity of the small fruits.

It being the off year for apples, the quantity shown and the quality of the exhibits compared unfavorably with the preceding year. The constant repetition of a biennial apple crop suggests the effort to change the bearing year of a portion of the orchard, especially of the late varieties, which may be done by removing the blossoms for two or three successive bearing years on young or newly grafted trees.

Seldom, if ever, has the pear crop been more abundant, and except when carefully thinned the fruit was inferior in size and quality. There was a large quantity of pears shown at the Annual Exhibition, and while there were comparatively few specimens deserving special mention, there were fewer than usual that did not do credit to the growers and the Exhibition.

Peaches were shown in larger quantity than for several years. Some exhibits were of superior quality, while others showed unmistakable signs of being the product of diseased trees.

Plums were fairly represented. The increase in the number and quantity of Japanese varieties was especially noticeable, and they will doubtless prove a valuable addition to the list of plums heretofore under cultivation.

At the Strawberry Exhibition all popular varieties were well represented. The Marshall, as in previous years, won all the prizes where it was in competition. There has been complaint from some of the commercial growers that it has not proved sufficiently productive, while others have found it the most profitable variety they have grown. Whatever may be the final consensus of opinion as to its value as a field berry, there can be no question as to its superiority for the amateur and for exhibition. Several new seedlings were shown requiring further cultivation to establish their standing. Of recent introductions the Clyde seems to be the most popular variety. The fruit is of medium size and fair quality; the plant is a strong grower, and, as far as tested, proves remarkably productive. It will be placed on the premium list for 1898.

A pleasing and encouraging feature of our exhibitions has been the steady but constant improvement of the fruit placed on exhibition. The exhibitors are more careful in the selection and arrangement of their specimens, and where the competition is between single dishes of the same varieties there is little encouragement to compete with inferior or imperfect specimens.

Campbell's Early Grape was shown at three exhibitions, and the specimens were an improvement in appearance and quality over those exhibited last year. There were seedling apples, pears, and grapes from other States shown during the season, but the Committee could not, after careful examination, discover any single point of excellence over similar fruits already in general cultivation.

Most of our new fruits have been chance seedlings. The fruit growers have hardly kept pace with the florists in improvement by cross-fertilization, as note the improvement in the rose, chrysanthemum, and carnation within the last ten years. Cross-breeding of animals shows what may be accomplished by intelligent and persevering effort and the selection of parents with a definite object in view. Fruits and flowers seem equally susceptible of improvement by cross-fertilization.

The Committee have awarded in prizes and gratuities $1,604, leaving an unexpended balance of $196.

E. W. Wood,
O. B. Hadwen,
Samuel Hartwell,
Warren Fenno,
} *Committee.*

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1897.

SPRING EXHIBITION.

MARCH 23, 24, 25, AND 26.

WINTER APPLES. — Baldwin, J. V. Fletcher	$3 00
Second, John W. Clark	2 00
Third, Charles W. Boyden	1 00
Northern Spy, F. J. Boyden	3 00
Second, George V. Fletcher	2 00
Third, George C. Rice	1 00
Roxbury Russet, H. R. Kinney	3 00
Second, George V. Fletcher	2 00
Third, Charles C. Boyden	1 00
Tompkins King, George C. Rice	3 00
Second, F. J. Kinney	2 00
Third, Charles C. Boyden	1 00
Any other variety, George C. Rice, Yellow Bellflower	3 00
Second, George C. Rice, Palmer	2 00
Third, George V. Fletcher, Rhode Island Greening	1 00
STRAWBERRIES. — One pint, E. S. Converse	3 00
Gratuity : —	
Jackson Dawson, Strawberry plants in fruit	2 00

MAY 29.

Gratuity : —	
William Brown, Hothouse peaches	2 00

RHODODENDRON SHOW.

JUNE 3 AND 4.

Gratuity : —	
E. S. Converse, Nectarines	1 00

JUNE 12.

Gratuities : —	
Hon. Joseph S. Fay, Strawberries	2 00
W. N. Craig, "	1 00
William Doran & Son, "	1 00

JUNE 19.

Gratuity : —	
Estate of Joseph S. Fay, Strawberries	2 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 AND 23.

Special Prizes from the Theodore Lyman Fund.

STRAWBERRIES. — Four quarts of any variety, Varnum Frost, Marshall	$20 00
Second, George E. Horne, Marshall	16 00
Third, Estate of Joseph S. Fay, Marshall	12 00
Fourth, Warren Heustis & Son, "	10 00
Fifth, George V. Fletcher, "	8 00

Special Prizes offered by the Society.

Two quarts of any variety, best adapted for garden cultivation, for home use, to be judged by points, Estate of Joseph S. Fay, Marshall	6 00
Second, Warren Heustis & Son, Marshall	5 00
Third, Isaac E. Coburn, Jessie	4 00
Fourth, George V. Fletcher, Marshall	3 00

Regular Prizes.

For the largest and best collection, not less than twenty baskets of two quarts each, and not less than five varieties, George F. Wheeler	25 00
Second, I. E. Coburn	20 00
Ten baskets of two quarts each, not less than three varieties, George F. Wheeler	15 00
Second, I. E. Coburn	12 00
Five baskets, two quarts each, of one variety, George E. Horne	8 00
Two quarts of Belmont, George V. Fletcher	4 00
Second, Varnum Frost	3 00
Bubach, George E. Horne	4 00
Second, I. E. Coburn	3 00
Third, George V. Fletcher	2 00
Champion, George E. Horne	4 00
Charles Downing, Miss Mary S. Walker	4 00
Second, George F. Wheeler	3 00
Third, William Doran & Son	2 00
Crescent, George F. Wheeler	4 00
Second, I. E. Coburn	3 00
Third, Rev. C. Terry	2 00
Haverland, I. E. Coburn	4 00
Second, John C. Haskell	3 00
Third, George F. Wheeler	2 00
Hersey, George F. Wheeler	4 00
Jessie, George V. Fletcher	4 00
Second, I. E. Coburn	3 00
Third, George F. Wheeler	2 00

Leader, William Doran & Son	$4 00
Second, George F. Wheeler	3 00
Third, E. S. Converse	2 00
Marshall, Varnum Frost	4 00
Second, Estate of Joseph S. Fay	3 00
Third, George E. Horne	2 00
Miner's Prolific, Charles S. Smith	4 00
Second, George F. Wheeler	3 00
Parker Earle, I. E. Coburn	4 00
Second, George F. Wheeler	3 00
Sharpless, George E. Horne	4 00
Second, William Doran & Son	3 00
Timbrell, the second prize to William Doran & Son	3 00
Any other variety, George F. Wheeler, Enormous	4 00
Second, S. H. Warren, Clyde	3 00
Third, I. E. Coburn, Beverly	2 00
Collection, not less than six varieties, one quart each, I. E. Coburn,	8 00
Second, George F. Wheeler	6 00
One quart of any new variety, not previously exhibited, S. H. Warren, Seedling No. 3	5 00
Second, George E. Horne, Seedling	4 00
CHERRIES. — Two quarts of any variety, O. R. Robbins	4 00
Second, George V. Fletcher	3 00
Third, Edwin Hastings	2 00
FOREIGN GRAPES. — Two bunches of any variety, Joseph H. White	6 00
Second, William C. Winter	4 00
FORCED PEACHES. — Six of any variety, A. Packard	3 00
Second, William C. Winter	2 00
Gratuity : —	
Edmund Hersey, Cranberries	1 00

JUNE 26.

STRAWBERRIES. — Two quarts of any variety, Warren Heustis & Son	4 00
Second, Estate of Joseph S. Fay	3 00
Third, E. L. Smith	2 00
Gratuity : —	
Thomas Harrison, Cherries	1 00

JULY 3.

CHERRIES. — Two quarts of Black Eagle, E. S. Converse	3 00
Second, Frederick W. Damon	2 00
Third, A. F. Coolidge	1 00
Black Tartarian, George V. Fletcher	3 00
Second, Charles B. Travis	2 00
Third, Edwin Hastings	1 00

Coe's Transparent, John L. Bird	$3 00
Downer, M. W. Chadbourne	3 00
Any other variety, Charles B. Travis, Elton	3 00
Second, Charles S. Smith, Governor Wood	2 00
Third, George V. Fletcher	1 00

Gratuities: —

Warren Heustis & Son, Strawberries	1 00
William C. Winter, Foreign Grapes	2 00
E. S. Converse, Peaches	1 00
William Doran & Son, Collection	2 00

JULY 10.

RASPBERRIES. — Two quarts of any variety, Benjamin G. Smith	3 00
Second, Frederick W. Damon	2 00
CURRANTS. — Two quarts of any Red variety, W. N. Craig, Fay's	4 00
Second, Sumner Coolidge, Fay's	3 00
Third, William Doran & Son, Versaillaise	2 00
Fourth, W. N. Craig, Versaillaise	1 00
Two quarts of any White variety, Frederick W. Damon	3 00
Second, Mrs. Arthur W. Blake	2 00
Third, E. S. Converse	1 00
GOOSEBERRIES. — Two quarts of any variety of American origin, Joseph S. Chase, Triumph	4 00
Second, W. N. Craig, Columbus	3 00
Third, W. G. Kendall, Chatauqua	2 00
Fourth, Starkes Whiton, Bates's Seedling	1 00

Gratuities: —

Warren Heustis & Son, Marshall Strawberries	1 00
M. W. Chadbourne, Cherries	1 00
E. S. Chapell, "	1 00

JULY 17.

RASPBERRIES. — Two quarts of any variety, Benjamin G. Smith	3 00
Second, William Doran & Son, Franconia	2 00
Third, William Doran & Son, Antwerp	1 00
CURRANTS. — One quart of any Red variety, W. N. Craig, Versaillaise	3 00
Second, Sumner Coolidge	2 00
Third, W. N. Craig, Fay's	1 00
One quart of any White variety, Francis Blake, White Grape	2 00
Second, George V. Fletcher, White Grape	1 00
GOOSEBERRIES. — Two quarts of any Foreign variety, Benjamin G. Smith, Hero of the Nile	4 00
Second, Benjamin G. Smith, Green Ocean	3 00
Third, Benjamin G. Smith, Ashton	2 00
Fourth, W. N. Craig, Industry	1 00

Gratuities: —

Charles S. Smith, Cherries	$1 00
Vera Chapell, "	1 00

A. H. Griesa, Lawrence, Kansas, for Superb Apricot, a First Class Certificate of Merit.

JULY 24.

BLACKBERRIES. — Two quarts of any variety, M. W. Chadbourne	3 00
Second, Nathaniel T. Kidder	2 00
APPLES. — Tetofsky, Sumner Coolidge	3 00
Second, M. W. Chadbourne	2 00
Third, Samuel Hartwell	1 00
PEARS. — Summer Doyenne, E. S. Converse	3 00
Second, Leverett M. Chase	2 00
Third, Warren Fenno	1 00
PEACHES. — Six of any variety, William C. Winter	3 00
Second, W. D. Hinds	2 00

Gratuities: —

P. Murray Winter, Seedling Gooseberry	1 00
James L. Little, Seedling Gooseberries	1 00
W. D. Hinds, Collection of Raspberries	1 00

JULY 31.

APPLES. — Red Astrachan, Frederick W. Damon	3 00
Second, William C. Winter	2 00
Third, Warren Fenno	1 00
Sweet Bough, George V. Fletcher	3 00
Second, Charles B. Travis	2 00
Third, Warren Fenno	1 00
Any other variety, Sumner Coolidge, Williams's Favorite	3 00
Second, Joshua C. Stone	2 00
PEARS. — Giffard, Rufus T. Tobey	3 00
Second, Mrs. Emmons	2 00
Third, A. T. Brown	1 00
Any other variety, Mrs. S. Klaus, Clapp's Favorite	3 00
Second, A. T. Brown " "	2 00
Third, Sumner Coolidge " "	1 00
BLACKBERRIES. — Two quarts of any variety, Sumner Coolidge	3 00
Second, M. W. Chadbourne	2 00
Third, Francis Blake	1 00
PEACHES. — Outdoor culture, any variety, William G. Prescott	3 00
Second, Francis Blake	2 00
Third, N. D. Harrington	1 00

AUGUST 7.

APPLES. — Oldenburg, J. V. Fletcher	$3 00
Any other variety, Frederick W. Damon, Red Astrachan	3 00
Second, Warren Fenno, Red Astrachan	2 00
Third, George V. Fletcher, Sweet Bough	1 00
PEARS. — Clapp's Favorite, Mrs. S. Klaus	3 00
Second, Sumner Coolidge	2 00
Third, A. T. Brown	1 00
Any other variety, Frederick W. Damon	2 00
Second, Warren Fenno	1 00
PEACHES. — Twelve specimens of outdoor culture, any variety, George H. Sherwin, Hale's Early	3 00
Second, Charles F. Curtis, Hale's Early	2 00
Third, Francis Blake, Amsden	1 00
Six specimens, cold house or pot culture, William C. Winter	3 00
PLUMS. — Japanese, any variety, T. A. Greenleaf, Abundance	3 00
Second, W. D. Hinds, Burbank	2 00
Third, W. D. Hinds, Abundance	1 00
FOREIGN GRAPES. — Two bunches of any variety, Miss Eleanor J. Clark, Pomfret, Conn., Black Hamburg	5 00
Second, E. S. Converse, Syrian	4 00

AUGUST 14.

APPLES. — Summer Pippin, Samuel Hartwell	3 00
Second, Warren Fenno	2 00
Williams's Favorite, Joshua C. Stone	3 00
Second, Charles F. Curtis	2 00
Third, Sumner Coolidge	1 00
Any other variety, H. F. Tuttle, Red Astrachan	3 00
Second, Samuel Hartwell, Gravenstein	2 00
Third, Samuel Hartwell, Bietigheimer	1 00
PEARS. — Rostiezer, M. W. Chadbourne	3 00
Second, S. F. & F. L. Weston	2 00
Third, A. T. Brown	1 00
Tyson, Leverett M. Chase	3 00
Second, John L. Bird	2 00
Third, Clifford R. Weld	1 00
Any other variety, Sumner Coolidge, Clapp's Favorite	3 00
Second, Mrs. S. Klaus, " "	2 00
Third, A. T. Brown, " "	1 00
PEACHES. — Any variety, Sumner Coolidge, Early Rivers	3 00
Second, E. S. Converse, Royal George	2 00
Third, H. F. Tuttle, Early Rivers	1 00
PLUMS. — Japanese, any variety, William C. Winter, Abundance	3 00
Second, W. D. Hinds, Abundance	2 00
Third, W. D. Hinds, Burbank	1 00

Gratuities: —

Joseph S. Chase, Collection of Japanese Plums	$1 00
William C. Winter, Cold House Peaches	1 00

AUGUST 21.

APPLES. — Foundling, the second prize to Warren Fenno	2 00
Gravenstein, Samuel Hartwell	3 00
Second, Warren Heustis & Son	2 00
Third, W. D. Hinds	1 00
Maiden's Blush, Warren Fenno	3 00
Second, William C. Winter	2 00
Third, Joshua C. Stone	1 00
Porter, M. W. Chadbourne	3 00
Second, Joshua C. Stone	2 00
Third, Samuel Hartwell	1 00
Any other variety, Joshua C. Stone, Williams's Favorite	3 00
Second, Samuel Hartwell, Summer Pippin	2 00
Third, W. D. Hinds, Williams's Favorite	1 00
PEARS. — Andrews, E. S. Converse	3 00
Second, Joshua C. Stone	2 00
Bartlett, William Milman	3 00
Second, Mrs. S. Klaus	2 00
Third, A. T. Brown	1 00
Souvenir du Congrès, A. T. Brown	3 00
Second, Warren Fenno	2 00
Third, M. W. Chadbourne	1 00
Any other variety, Mrs. S. Klaus	3 00
Second, J. L. Duncan	2 00
Third, A. T. Brown	1 00
PEACHES. — Collection, the third prize to W. D. Hinds	2 00
Single dish of any variety, Sumner Coolidge	3 00
Second, Francis Blake	2 00
Third, T. A. Greenleaf	1 00
PLUMS. — Bradshaw, George V. Fletcher	3 00
Second, William H. Hunt	2 00
Any other variety, Sumner Coolidge, Abundance	3 00
Second, T. A. Greenleaf, "	2 00
Third, W. D. Hinds, "	1 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 1 AND 2.

FOREIGN GRAPES. — Two bunches of Black Alicante, Miss Eleanor J. Clark, Pomfret, Conn.	5 00
Black Hamburg, Miss E. J. Clark	5 00
Second, E. S. Converse	4 00

Golden Hamburg, Miss E. J. Clark	$5 00
Lady Downes, the second prize to E. S. Converse	4 00
Muscat of Alexandria, Joseph H. White	5 00
Second, E. S. Converse	4 00
Any other variety, E. S. Converse, Blue Chasselas	5 00
Second, William C. Winter, Frontignan	4 00
Third, E. S. Converse, Red Chasselas	3 00

SEPTEMBER 4.

Gratuity : —

C. R. Safford, Crawford's Early Peaches	1 00

SEPTEMBER 11.

APPLES. — Gravenstein, Samuel Hartwell	3 00
Second, C. L. Hartshorn	2 00
Third, Charles S. Smith	1 00
Maiden's Blush, W. G. Kendall	3 00
Second, Warren Fenno	2 00
Third, H. R. Kinney	1 00
Porter, M. W. Chadbourne	3 00
Second, Frederick W. Damon	2 00
Third, Joshua C. Stone	1 00
Pumpkin Sweet, Samuel Hartwell	3 00
Any other variety, Warren Fenno, Washington Strawberry	3 00
Second, Joshua C. Stone, " "	2 00
Third, Warren Fenno, Twenty Ounce	1 00
CRAB APPLES. — Twenty-four specimens of Transcendent, Warren Fenno	2 00
Any other variety, M. W. Chadbourne, Hyslop	2 00
Second, Joshua C. Stone, Hyslop	1 00
PEARS. — Bartlett, William Milman	3 00
Second, Sumner Coolidge	2 00
Third, Mrs. S. Klaus	1 00
Belle Lucrative, Charles E. Richardson	3 00
Second, E. S. Converse	2 00
Third, A. T. Brown	1 00
Boussock, Sumner Coolidge	3 00
Second, W. H. Chipman	2 00
Third, M. W. Chadbourne	1 00
Hardy, Warren Fenno	3 00
Second, Mrs. E. M. Gill	2 00
Third, Rufus T. Tobey	1 00
Paradise of Autumn, William Milman	3 00
Second, Leverett M. Chase	2 00
Third, Warren Fenno	1 00

Any other variety, Charles E. Swain, Bosc	$3 00
Second, Mrs. S. Klaus, Seckel	2 00
Third, Warren Fenno, Souvenir du Congrès	1 00
PEACHES. — Coolidge's Favorite, Sumner Coolidge	3 00
Second, Charles S. Smith	2 00
Third, Samuel Hartwell	1 00
Crawford's Early, N. D. Harrington	3 00
Second, Francis Blake	2 00
Third, F. W. Mendum	1 00
Crosby, W. D. Hinds	3 00
Second, T. A. Greenleaf	2 00
Foster, Charles F. Curtis	3 00
Second, Bowman Kenrick	2 00
Third, C. R. Safford	1 00
Oldmixon Freestone, Sumner Coolidge	3 00
Second, Bowman Kenrick	2 00
Third, Elliott Moore	1 00
Stump the World, Leverett M. Chase	3 00
Second, Louville Curtis	2 00
Third, T. A. Greenleaf	1 00
Any other variety, T. A. Greenleaf, Mountain Rose	3 00
Second, Benjamin G. Smith, Champion	2 00
Third, Rufus T. Tobey, Mountain Rose	1 00
PEACHES, ORCHARD HOUSE CULTURE. — Any variety, Miss Alice Carey	4 00
Second, Joseph H. White	3 00
NECTARINES, OUTDOOR CULTURE. — Any variety, C. C. Donnell	4 00
Second, Francis Blake	3 00
PLUMS. — Imperial Gage, George V. Fletcher	3 00
Second, William H. Hunt	2 00
Lombard, John L. Bird	3 00
Second, Mrs. S. Klaus	2 00
Third, Leverett M. Chase	1 00
Washington, Charles F. Curtis	3 00
Any other variety, Mrs. Mary T. Goddard, Pond's Seedling	3 00
Second, George V. Fletcher, Bradshaw	2 00
Third, William C. Winter, Yellow Egg	1 00
Japanese Plums, any variety, T. A. Greenleaf, Satsuma	3 00
Second, W. D. Hinds, Burbank	2 00
NATIVE GRAPES. — Six bunches of Eumelan, Benjamin G. Smith	3 00
Second, Frederick W. Damon	2 00
Massasoit, Joseph S. Chase	3 00
Second, F. J. Kinney	2 00
Moore's Early, Frederick W. Damon	3 00
Second, C. R. Robbins	2 00
Third, F. J. Kinney	1 00

Any other variety, George W. Campbell, Delaware, Ohio, Campbell's Early	$3 00
Second, Benjamin G. Smith, Wilder	2 00
Third, H. R. Kinney, Green Mountain	1 00
Any variety from girdled vines, F. J. Kinney, Worden	3 00
Second, F. J. Kinney, Moore's Early	2 00
Third, H. R. Kinney, Agawam	1 00
Figs. — Any variety, the second prize to William McRoberts	1 00

September 18.

Gratuities: —

Horace Eaton, Peaches	1 00
William Everett, Souvenir du Congrès Pears	1 00

September 25.

Gratuity: —

Warren Heustis & Son, Seedling Peaches	1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

September 30 and October 1.

Special Prizes from the Samuel Appleton Fund.

Apples. — Baldwin, Joshua C. Stone	5 00
Hubbardston, M. W. Chadbourne	5 00
Pears. — Bosc, Sumner Coolidge	5 00
Sheldon, Frederick W. Damon	5 00

Benjamin V. French Fund.

Apples. — Gravenstein, C. L. Hartshorn	5 00
Rhode Island Greening, C. L. Hartshorn	5 00

Marshall P. Wilder Fund.

Pears. — Anjou, William Milman	4 00
Second, Mrs. S. Klaus	3 00
Third, George V. Fletcher	2 00
Fourth, Sumner Coolidge	1 00
Bartlett, A. T. Brown	4 00
Second, George V. Fletcher	3 00
Third, William Milman	2 00
Fourth, Leverett M. Chase	1 00
Native Grapes. — Twelve bunches of Concord, H. R. Kinney	4 00
Second, George W. Jameson	3 00
Third, F. J. Kinney	2 00
Twelve bunches of Worden, F. J. Kinney	4 00
Second, Samuel Hartwell	3 00
Third, H. R. Kinney	2 00

Regular Prizes, Theodore Lyman Fund.

APPLES. — Baldwin, Sumner Coolidge	$4 00
Second, Mrs. Mary T. Goddard	3 00
Third, Joshua C. Stone	2 00
Dutch Codlin, Warren Fenno	3 00
Second, Sumner Coolidge	2 00
Holden, the second prize to H. R. Kinney	2 00
Third, Charles S. Smith	1 00
Fameuse, H. Whittaker	3 00
Second, Sumner Coolidge	2 00
Third, M. W. Chadbourne	1 00
Fletcher Russet, John Fletcher	3 00
Second, William H. Teele	2 00
Third, Charles F. Curtis	1 00
Gloria Mundi, Samuel Hartwell	3 00
Golden Russet, Henry E. Rich	2 00
Second, Mrs. Mary T. Goddard	1 00
Gravenstein, Benjamin M. Smith	4 00
Second, C. L. Hartshorn	3 00
Third, Charles S. Smith	2 00
Hubbardston, Mrs. Rose Buxton	4 00
Second, John Parker	3 00
Third, Samuel Hartwell	2 00
Hunt Russet, Samuel Hartwell	3 00
Second, William H. Teele	2 00
Third, S. P. Buxton	1 00
Mackintosh, F. J. Kinney	4 00
Second, George C. Rice	3 00
Third, C. M. Handley	2 00
Maiden's Blush, Warren Fenno	2 00
Northern Spy, William S. Janvrin	3 00
Second, Henry E. Rich	2 00
Third, George V. Fletcher	1 00
Porter, the second prize to George V. Fletcher	2 00
Third, Frederick W. Damon	1 00
Pound Sweet, George V. Fletcher	3 00
Second, Samuel Hartwell	2 00
Rhode Island Greening, C. L. Hartshorn	4 00
Second, A. H. Newton	3 00
Third, Henry E. Rich	2 00
Roxbury Russet, Jacob A. Leonard	4 00
Second, Sumner Coolidge	3 00
Third, Warren Fenno	2 00
Sutton, C. L. Hartshorn	3 00
Second, Henry E. Rich	2 00
Tolman's Sweet, Jacob A. Leonard	3 00

Tompkins King, George C. Rice	$3 00
Second, E. L. Conant	2 00
Third, F. J. Kinney	1 00
Any other variety, F. J. Kinney, Washington Strawberry	3 00
Second, George C. Rice, Fallawater	2 00
Third, George C. Rice, Yellow Bellflower	1 00
CRAB APPLES. — Hyslop, twenty-four specimens, J. L. Richardson,	2 00
Second, C. L. Hartshorn	1 00
EDIBLE NUTS. — Collection, named, Parry's Pomona Nurseries, Parry, N.J.	10 00

Special Prizes offered by the Society.

PEARS. — Anjou, A. K. Gould	5 00
Seckel, Joshua C. Stone	5 00
PEACHES. — Any variety, Francis Blake	5 00
NATIVE GRAPES. — Any variety, Mount Vernon Nursery	5 00

Society's Regular Prizes.

PEARS. — Angouleme, W. S. Janvrin	4 00
Second, A. T. Brown	3 00
Third, Mrs. Emmons	2 00
Fourth, Frederick W. Damon	1 00
Bosc, E. S. Converse	4 00
Second, Orlendo W. Dimick	3 00
Third, A. T. Brown	2 00
Fourth, Mary E. Walker	1 00
Clairgeau, W. S. Janvrin	3 00
Second, Warren Fenno	2 00
Third, Sumner Coolidge	1 00
Comice, A. T. Brown	3 00
Second, Mrs. Emmons	2 00
Third, Frederick W. Damon	1 00
Dana's Hovey, A. T. Brown	4 00
Second, Frederick W. Damon	3 00
Third, E. W. Wood	2 00
Fourth, George V. Fletcher	1 00
Diel, A. T. Brown	3 00
Second, Joshua C. Stone	2 00
Third, Mrs. Emmons	1 00
Fulton, E. S. Converse	3 00
Second, S. F. & F. L. Weston	2 00
Third, John Ward	1 00
Hardy, Charles F. Curtis	3 00
Second, William Milman	2 00
Third, Rufus T. Tobey	1 00
Howell, Warren Fenno	3 00
Second, A. K. Gould	2 00
Third, S. F. & F. L. Weston	1 00

Josephine of Malines, Warren Fenno	$3 00
Lawrence, W. S. Janvrin	3 00
Second, A. T. Brown	2 00
Third, Charles E. Swain	1 00
Louise Bonne of Jersey, Francis Blake	3 00
Second, A. T. Brown	2 00
Third, Charles E. Richardson	1 00
Marie Louise, Charles E. Swain	3 00
Second, Warren Fenno	2 00
Third, Mrs. Jones	1 00
Merriam, A. T. Brown	3 00
Second, Frederick W. Damon	2 00
Third, Warren Heustis & Son	1 00
Seckel, David Perkins	4 00
Second, N. D. Harrington	3 00
Third, Mrs. J. W. Porter	2 00
Fourth, Mrs. S. Klaus	1 00
Sheldon, N. D. Harrington	4 00
Second, A. T. Brown	3 00
Third, Frederick W. Damon	2 00
Fourth, Sumner Coolidge	1 00
St. Michael Archangel, T. M. Davis	3 00
Second, Warren Fenno	2 00
Third, Warren Heustis & Son	1 00
Superfin, Warren Fenno	3 00
Second, Sumner Coolidge	2 00
Third, Clifford R. Weld	1 00
Urbaniste, Mrs. Emmons	3 00
Second, A. T. Brown	2 00
Third, E. S. Converse	1 00
Vicar, A. T. Brown	3 00
Second, Mrs. Jones	2 00
Third, E. S. Converse	1 00
Winter Nelis, Mrs. Emmons	3 00
Second, A. T. Brown	2 00
Third, Clifford R. Weld	1 00
Any other variety, Warren Fenno, Pratt	3 00
Second, Rufus T. Tobey, Mount Vernon	2 00
Third, Henry Y. Gilson, Flemish Beauty	1 00
QUINCES. — Champion, Orlendo W. Dimick	3 00
Second, George V. Fletcher	2 00
Third, Charles S. Smith	1 00
Orange, Arthur F. Coolidge	3 00
Second, J. L. Richardson	2 00
Third, Joshua C. Stone	1 00
Pear, Benjamin G. Smith	3 00
Second, George L. Brown	2 00
Third, George V. Fletcher	1 00

Rea, Warren Fenno	$3 00
PEACHES. — Crawford's Late, E. M. Bruce	3 00
Second, Francis Blake	2 00
Third, H. R. Kinney	1 00
Any other variety, Benjamin M. Smith, Elberta	3 00
Second, N. D. Harrington, Seedling	2 00
Third, Charles E. Swain, Oldmixon	1 00
PEACHES, ORCHARD HOUSE CULTURE. — Any variety, Robert McLeod, Newport, R.I.	4 00
Second, Robert McLeod	3 00
PLUMS. — Coe's Golden Drop, A. K. Gould	2 00
Second, William C. Winter	1 00
Yellow Egg, George V. Fletcher	2 00
Any other variety, P. G. Hanson, Jefferson	2 00
Second, Sumner Coolidge	1 00
NATIVE GRAPES. — Six bunches of Brighton, Thomas H. Talbot	3 00
Second, Mount Vernon Nursery	2 00
Third, Samuel Hartwell	1 00
Delaware, Mount Vernon Nursery	3 00
Second, Frederick W. Damon	2 00
Third, Warren Fenno	1 00
Herbert, Benjamin G. Smith	3 00
Second, Mount Vernon Nursery	2 00
Iona, Mount Vernon Nursery	3 00
Second, Frederick W. Damon	2 00
Third, Benjamin G. Smith	1 00
Lindley, Benjamin G. Smith	3 00
Third, Frederick W. Damon	1 00
Niagara, E. S. Converse	3 00
Second, George A. Wills	2 00
Third, Benjamin G. Smith	1 00
Pocklington, Frederick W. Damon	3 00
Second, P. G. Hanson	2 00
Third, S. F. & F. L. Weston	1 00
Prentiss, Mount Vernon Nursery	3 00
Second, Benjamin G. Smith	2 00
Wilder, Benjamin G. Smith	3 00
Second, Frederick W. Damon	2 00
Third, F. J. Kinney	1 00
Any other variety, Mount Vernon Nursery, Vergennes	3 00
Second, Frederick W. Damon, Moore's Early	2 00
Third, Frederick W. Damon, Diamond	1 00
Concord, from girdled vines, H. R. Kinney	3 00
Second, F. J. Kinney	2 00
FOREIGN GRAPES. — Two bunches of any variety, E. S. Converse, Chasselas	5 00
Second, E. S. Converse, Black Alicante	4 00

CRANBERRIES. — Half peck, L. J. Fosdick, Gloriana	$3 00
Second, L. J. Fosdick, McFarlin	2 00
Third, L. J. Fosdick, Early Black	1 00
Gratuities : —	
James Comley, Collection	3 00
Mrs. E. M. Gill, "	1 00
Robert Manning, Figs	1 00
Ellwanger & Barry, Collection of Pears and Quinces, Appleton Silver Medal.	

OCTOBER 16.

Gratuities : —	
Elbridge Torrey, Sheldon Pears	1 00
William C. Clapp, " "	1 00
John L. Gardner, Seckel Pears	1 00
S. S. Crosby, Quinces	1 00
Frederick W. Damon, Iona Grapes	1 00

OCTOBER 23.

Gratuity : —	
William C. Clapp, Seckel Pears	1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 20.

Benjamin V. French Fund.

APPLES. — Baldwin, Mrs. A. W. Blake	5 00

Society's Prizes.

APPLES. — Baldwin, Mrs. A. W. Blake	3 00
Second, J. W. Clark	2 00
Third, Mrs. Mary T. Goddard	1 00
Danvers Sweet, Benjamin P. Ware	3 00
Fletcher Russet, John Fletcher	3 00
Second, William H. Teele	2 00
Hubbardston, M. W. Chadbourne	3 00
Second, John Parker	2 00
Hunt Russet, Samuel Hartwell	3 00
Second, William H. Teele	2 00
Third, F. J. Boyden	1 00
Northern Spy, William O'Connell	3 00
Second, W. S. Janvrin	2 00
Third, George V. Fletcher	1 00
Rhode Island Greening, George V. Fletcher	3 00
Second, H. A. Wheeler	2 00
Third, F. J. Boyden	1 00

Roxbury Russet, George V. Fletcher	$3 00
Second, Warren Fenno	2 00
Third, F. J. Boyden	1 00
Tolman's Sweet, A. E. Underwood	3 00
Tompkins King, John W. Clark	3 00
Second, George C. Rice	2 00
Third, Walter E. Overend	1 00
Any other variety, A. E. Underwood, Yellow Bellflower	3 00
Second, O. R. Miller, Ben Davis	2 00
Third, F. J. Boyden, Palmer	1 00
PEARS. — Angouleme, A. T. Brown	4 00
Second, Frederick W. Damon	3 00
Third, Warren Fenno	2 00
Fourth, Mrs. Emmons	1 00
Anjou, George V. Fletcher	4 00
Second, William O'Connell	3 00
Third, Mrs. S. Klaus	2 00
Fourth, William Milman	1 00
Clairgeau, Warren Fenno	3 00
Second, W. S. Janvrin	2 00
Third, William T. Hall	1 00
Comice, A. T. Brown	4 00
Second, Mrs. Emmons	3 00
Third, Frederick W. Damon	2 00
Fourth, Walter E. Overend	1 00
Dana's Hovey, A. T. Brown	4 00
Second, Frederick W. Damon	3 00
Third, George V. Fletcher	2 00
Fourth, Warren Fenno	1 00
Diel, Mrs. Emmons	3 00
Second, Mrs. Whitney	2 00
Third, A. T. Brown	1 00
Glout Morceau, E. A. Hall	3 00
Second, W. H. Chipman	2 00
Third, Clifford R. Weld	1 00
Josephine of Malines, Warren Fenno	3 00
Second, Walter E. Overend	2 00
Third, John L. Bird	1 00
Langelier, Mrs. S. Klaus	3 00
Second, Clifford R. Weld	2 00
Third, T. M. Davis	1 00
Lawrence, W. S. Janvrin	3 00
Second, A. T. Brown	2 00
Third, Rufus T. Tobey	1 00
Vicar, Mrs. Jones	3 00
Second, A. T. Brown	2 00
Third, F. H. Gilson	1 00

Winter Nelis, Mrs. Emmons	$3 00
Second, A. T. Brown	2 00
Third, T. M. Davis	1 00
Any other variety, William Milman, Mount Vernon	3 00
Second, A. T. Brown, Bosc	2 00
Third, Frederick W. Damon, Sheldon	1 00
FOREIGN GRAPES. — Two bunches of any variety, George McWilliam, Alicante	5 00
Second, George McWilliam, Lady Downes	4 00
Third, George McWilliam, Mrs. Pearson	3 00

Gratuity : —

George W. Campbell, Delaware, Ohio, Seedling Grape, Campbell's Early, First Class Certificate of Merit.

REPORT

OF THE

COMMITTEE ON VEGETABLES

FOR THE YEAR 1897.

By CHARLES N. BRACKETT, CHAIRMAN.

The past season has been an unusually trying one to the growers of vegetables. Owing to the too frequent rains, followed by cold cloudy weather during the growing season, many crops suffered severely, while some of the leading ones proved almost entire failures. It follows as a natural consequence that some of our exhibitions were to a greater or less extent affected from this cause. Yet, notwithstanding all the drawbacks and discouragements with which our contributors had to contend, the exhibits have on the whole been more satisfactory than we were led to expect.

Good cultivation, it is true, enters largely into our success as tillers of the soil, but it does not follow that he who tills best shall always have the largest yield. It matters not how fertile the soil when climatic influences are adverse. So much depends on atmospheric conditions during certain periods of plant growth that, although all other requisites are complete, total failures are sometimes the inevitable result, some sections being blest with abundant crops, while those of others are poor and imperfect. The cultivator, of all men, must continually feel himself at the mercy of the elements; he can never count with safety upon a crop until it is harvested.

During the winter months forced vegetables have been shown in about the usual quantity and variety, most of the prizes having been competed for and awarded.

On nearly every Saturday from the 2d of January to the 27th of November creditable exhibits of vegetables (forced or other) have been made in greater or less quantity, many of them of great excellence.

The weekly summer shows, while not presenting any extraordinary features, have generally been good, each week bringing many exhibitors and quite a throng of interested visitors, who seemed always ready to express their appreciation of the variety of objects placed upon the tables for their inspection.

As a complete list of contributors and the awards made to each constitutes a part of this report, we shall not attempt to describe, in detail, the exhibits made, but will only mention such as appear to be deserving of special notice, either as new or out of the ordinary line of exhibits.

The first of this kind which claimed our attention were some extraordinarily fine and well-grown specimens of Mushrooms (*Agaricus campestris*) shown by A. W. Crockford, February 6, and later, on several occasions, by James Comley, whose specimens have rarely, if ever, been excelled. May 15 P. G. Hanson showed remarkably large and well-grown Asparagus — four bunches, containing twelve stalks each, which weighed 10 lbs.

A new Pea was exhibited June 26 and July 3 by George D. Moore, under the name of Henderson's 1897, receiving the first prize on both occasions. The pods were large and well filled with peas of excellent quality, as we can testify from trial. We consider it a decided acquisition and worthy of trial.

We must not fail to mention the splendid specimens of Greenflesh Melons shown by Edward Russell, August 7. We think they were the finest ever seen in the Hall. A single specimen tipped the scales at 25½ lbs. They were certainly highly creditable to the skill of the grower, and formed the centre of attraction at this show.

By way of comparison with other seasons, it may be of interest to note the date of some of the first exhibits of a few of our most important vegetables.

The first Asparagus of the season was shown May 1, William H. Hunt receiving the first prize. Peas were exhibited for the first time June 19, Isaac E. Coburn showing two varieties. The first early Potatoes came from the Joseph S. Fay estate, July 3, and

were good enough to take all three of the prizes. The varieties were the Hebron, Rose, and Savoy. June 19, from the same place, came excellent specimens of Cauliflowers and three varieties of remarkably well-grown Lettuce, all of which were ample evidence of the skill of the gardener, M. H. Walsh. Tomatoes of outdoor growth were seen on our tables for the first time July 10, Sumner Coolidge and A. W. Blake being the exhibitors. The variety shown was Atlantic. This crop was among those which were badly injured by too much rain, and, although some fine specimens were on exhibition from time to time during the season, they were not shown in such large quantities and perfection as in previous seasons.

As usual, the closing weekly exhibition, September 11, was one of the most noteworthy of the season, and called forth a close competition from a large number of growers. There was a great variety, and most of the objects shown were at their best.

The Annual Exhibition, September 30 and October 1, was good, creditably sustaining this department of the Society's exhibitions. The large array of vegetables, comprising every seasonable variety, completely filled the Lower Hall and attracted much attention from the visiting public.

In speaking of the objects presented to the Committee for their examination on this occasion, we have only to say that the great and important feature of the exhibition was the total absence of ill-cultivated specimens. There were various degrees of excellence, it is true, but everything was excellent in its way. We may even add that some of the poorest specimens exhibited at this show would have carried away the first prizes less than twenty-five years ago.

The Potato and Tomato exhibits were much less in quantity than usual, both these crops having been more or less injured by unfavorable weather. The first prize for the best four varieties of Potatoes was awarded to F. J. Kinney, and B. S. Nickerson received the first for the best three varieties of Tomatoes.

There was also a very fine show of Celery on this occasion, the principal exhibitors being Messrs. Heustis, Bruce, Coolidge, and Hartshorn.

William N. Craig's collection of six varieties of remarkably well-grown Onions was deserving of special mention, he taking the first and second prizes in three different classes.

The interest manifested in our Native Mushrooms, noticed in our report last year, still continues without abatement, attracting a throng of interested persons at each and every exhibit that has been made throughout the season. All the prizes offered in the Schedule have been awarded.

Before closing this report we would call the attention of contributors to important changes and alterations in the Schedule for the coming year. The four prizes for the best collections of vegetables covering fifty square feet, arranged for effect, at the Annual Exhibition, which have been in the Schedule for the past two years, have been dropped, it being the unanimous opinion of the Committee that the amount devoted to this purpose could be more advantageously employed in furthering the interests of the Society in a different direction.

The amount appropriated for Vegetables for 1897 was	$1,200 00
The Committee have awarded in prizes and gratuities,	1,157 00
Leaving an unexpended balance of . . .	$43 00

All of which is respectfully submitted.

For the Committee,

C. N. BRACKETT, *Chairman.*

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1897.

January 2.

Gratuities: —

Warren Heustis & Son, Celery	$1 00
James Comley, "	1 00
Norris R. Comley, Rhubarb	1 00

January 9.

Radishes. — Four bunches of any variety, Arthur F. Coolidge	3 00
Cucumbers. — Pair of any variety, Francis Blake	3 00
Second, Nathaniel T. Kidder	2 00
Third, E. B. Smith	1 00
Cauliflowers. — Four specimens, William H. Teele	3 00
Lettuce. — Four heads of Tennisball, Arthur F. Coolidge	3 00
Second, E. B. Smith	2 00
Third, B. S. Nickerson	1 00
Parsley. — Two quarts, W. N. Craig	2 00
Second, Arthur F. Coolidge	1 00
Tomatoes. — Twelve specimens, William C. Winter, Stone	3 00
Second, William C. Winter, Livingston's	2 00
Third, Francis Blake, Essex	1 00

Gratuities: —

Hon. Aaron Low, Spinach	1 00
Warren Heustis & Son, Celery	1 00
Mrs. E. M. Gill, Mushrooms	1 00

January 16.

Gratuities: —

Warren Heustis & Son, Celery	1 00
Norris R. Comley, Rhubarb	1 00

January 23.

Gratuities: —

Hon. Aaron Low, Spinach	1 00
Mrs. E. M. Gill, Mushrooms	1 00
George D. Moore, Lettuce	1 00

February 6.

Radishes. — Four bunches of any variety, Arthur F. Coolidge	2 00
Second, Joshua C. Stone	1 00
Cucumbers. — Pair of any variety, Francis Blake	3 00
Second, H. J. Lund	2 00

Dandelions. — Peck, Warren Heustis & Son	$3 00
Lettuce. — Four heads of Tennisball, George D. Moore	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00
Mushrooms. — Twenty-four specimens, A. W. Crockford	3 00
Rhubarb. — Twelve stalks, C. F. Smith	3 00
Second, George Sanderson	2 00
Tomatoes. — Twelve specimens, Charles H. Hovey, South Pasadena, Cal.	3 00
Second, Francis Blake	2 00
Third, William C. Winter	1 00
Gratuities : —	
Warren Heustis & Son, Celery	1 00
Arthur F. Coolidge, "	1 00
Hon. Aaron Low, Spinach	1 00
A. W. Crockford, Mushrooms	1 00
Mrs. E. M. Gill, "	1 00

February 13.

Gratuity : —	
Warren Heustis & Son, Dandelions	1 00

February 20.

Gratuities : —	
George D. Moore, Radishes	1 00
Warren Heustis & Son, Dandelions	1 00

February 27.

Gratuities : —	
George D. Moore, Radishes	1 00
Hon. Aaron Low, Spinach	1 00
Arthur F. Coolidge, Collection	2 00

March 6.

Gratuities : —	
Mrs. E. M. Gill, Mushrooms	1 00
Warren Heustis & Son, Dandelions	1 00

March 13.

Gratuities : —	
E. B. Smith, Cucumbers	1 00
Hon. Aaron Low, Spinach	1 00
A. W. Crockford, Radishes	1 00
Arthur F. Coolidge, Collection	2 00

March 20.

Gratuities : —	
E. B. Smith, Cucumbers	1 00
George D. Moore, Collection	2 00
Arthur F. Coolidge, "	1 00

SPRING EXHIBITION.

MARCH 23, 24, 25, AND 26.

Prizes from the William J. Walker Fund.

RADISHES. — Four bunches of Turnip Rooted, H. R. Kinney	$2 00
Second, George D. Moore	1 00
Four bunches of Long Scarlet, H. R. Kinney	2 00
CUCUMBERS. — Pair of White Spine, George D. Moore	3 00
Second, E. B. Smith	2 00
CELERY. — Four roots, the third prize to H. R. Kinney	1 00
DANDELIONS. — Peck, Warren Heustis & Son	3 00
Second, Hon. Aaron Low	2 00
Third, Arthur F. Coolidge	1 00
LETTUCE. — Four heads of Tennisball, George D. Moore	3 00
Second, D. L. Tappan	2 00
Third, Arthur F. Coolidge	1 00
WATER CRESS. — Two quarts, Benjamin P. Ware	2 00
PARSLEY. — Two quarts, W. N. Craig	2 00
Second, H. R. Kinney	1 00
MUSHROOMS. — Twenty-four specimens, A. W. Crockford	3 00
Second, H. R. Kinney	2 00
Third, E. S. Converse	1 00
RHUBARB. — Twelve stalks, George Sanderson	3 00
Second, Joshua C. Stone	2 00
Third, James Comley	1 00
TOMATOES. — Twelve specimens, Francis Blake	3 00
Second, W. N. Craig, May's Favorite	2 00
Third, W. N. Craig, Eclipse	1 00
Gratuities: —	
Benjamin P. Ware, Brussels Sprouts	1 00
Warren Heustis & Son, Parsley	1 00
Hon. Aaron Low, Collection	3 00
George D. Moore, "	2 00

MARCH 27.

Gratuity: —	
George D. Moore, Lettuce and Cucumbers	1 00

APRIL 3.

CUCUMBERS. — Pair of White Spine, Varnum Frost	3 00
Second, George D. Moore	2 00
Third, E. B. Smith	1 00
Gratuities: —	
W. N. Craig, Tomatoes	1 00
Hon. Aaron Low, Dandelions	1 00
George D. Moore, Collection	2 00

APRIL 10.

Gratuity : —

James Comley, Collection $2 00

APRIL 17.

Gratuities : —

James Comley, Mushrooms and Lettuce 2 00
Mrs. E. M. Gill, Mushrooms 1 00
Warren Heustis & Son, Dandelions 1 00

APRIL 24.

Gratuities : —

James Comley, Mushrooms 1 00
Warren Heustis & Son, Dandelions 1 00
Hon. Aaron Low, Collection 1 00

MAY EXHIBITION.

MAY 1.

Prizes from the William J. Walker Fund.

ASPARAGUS. — Four bunches, twelve stalks each, William H. Hunt, 3 00
Second, Varnum Frost 2 00
Third, P. G. Hanson 1 00
CUCUMBERS. — Pair of White Spine, Varnum Frost . . . 3 00
Second, George D. Moore 2 00
Third, Arthur F. Coolidge 1 00
SPINACH. — Peck, Joshua C. Stone 3 00
Second, Arthur F. Coolidge 2 00
Third, Hon. Aaron Low 1 00
DANDELIONS. — Peck, George D. Moore 2 00
Second, Varnum Frost 1 00
LETTUCE. — Four heads, Arthur F. Coolidge 3 00
Second, Joshua C. Stone 2 00
Third, Mrs. Mary T. Goddard 1 00
RHUBARB. — Twelve stalks, Hon. Aaron Low 2 00
Second, Warren Heustis & Son 1 00

Gratuities : —

Mrs. Mary T. Goddard, Cauliflowers 1 00
H. R. Kinney, Radishes 1 00
William Nicholson, Tomatoes 1 00
W. C. Winter, " 1 00
James Comley, Mushrooms 2 00
Warren Heustis & Son, Dandelions 1 00
W. N. Craig, Collection 3 00
Arthur F. Coolidge, " 2 00
Hon. Aaron Low, " 1 00

MAY 8.

Gratuities : —

P. G. Hanson, Asparagus	$1 00
Warren Heustis & Son, Rhubarb	1 00
Varnum Frost, Cucumbers	1 00
Arthur F. Coolidge, Collection	3 00

MAY 15.

Gratuities : —

P. G. Hanson, Asparagus (weight of four bunches, ten pounds)	1 00
William H. Hunt, Asparagus	1 00
James Comley, Mushrooms	1 00
Arthur F. Coolidge, Collection	2 00
Warren Heustis & Son, "	1 00
Hon. Aaron Low, "	1 00

MAY 22.

Gratuities : —

P. G. Hanson, Asparagus	1 00
W. H. Hunt, "	1 00
James Comley, Mushrooms	1 00
George D. Moore, Collection	2 00
Hon. Aaron Low, "	1 00
Warren Heustis & Son, "	1 00

MAY 29.

Gratuity : —

Warren Heustis & Son, Collection	1 00

RHODODENDRON SHOW.

JUNE 3 AND 4.

Prizes from the Theodore Lyman Fund.

BEETS. — Twelve specimens, any variety, H. R. Kinney	3 00
Second, Arthur F. Coolidge	2 00
Third, Warren Heustis & Son	1 00
CARROTS. — Twelve Short Scarlet, W. N. Craig	3 00
Second, Warren Heustis & Son	2 00
RADISHES. — Four bunches of Turnip Rooted, Warren Heustis & Son,	2 00
Second, George D. Moore	1 00
Four bunches of Long Scarlet, George D. Moore	2 00
Second, H. R. Kinney	1 00
ASPARAGUS. — Four bunches, twelve stalks each, P. G. Hanson	3 00
Second, William H. Hunt	2 00
CUCUMBERS. — Pair, George D. Moore	3 00
Second, H. R. Kinney	2 00
Third, Arthur F. Coolidge	1 00

Lettuce. — Four heads, George D. Moore	$3 00
Second, Arthur F. Coolidge	2 00
Third, Warren Heustis & Son	1 00
Rhubarb. — Twelve stalks, George D. Moore	3 00
Second, Warren Heustis & Son	2 00
Third, W. N. Craig	1 00
Mushrooms. — Twenty-four specimens, H. R. Kinney	3 00
Second, Mrs. E. M. Gill	2 00
Tomatoes. — Twelve specimens, William C. Winter, Livingston	3 00
Second, William C. Winter, Stone	2 00
Third, M. S. Stevens, May's Favorite	1 00
Gratuities: —	
Warren Heustis & Son, Collection	2 00
George D. Moore, "	2 00
Arthur F. Coolidge, "	1 00
John Jeffries, "	1 00
Hon. Aaron Low, "	1 00

June 12.

Gratuities: —	
Hon. Joseph S. Fay, Cauliflowers and four varieties of Lettuce	3 00
Mrs. E. M. Gill, Mushrooms	1 00
George D. Moore, Collection	2 00
Hon. Aaron Low, "	1 00
W. N. Craig. "	1 00
Warren Heustis & Son, Collection	1 00

June 19.

Gratuities: —	
Estate of Joseph S. Fay, Cauliflowers and Lettuce	2 00
I. E. Coburn, two varieties of Peas	1 00

ROSE AND STRAWBERRY SHOW.

June 22 and 23.

Beets. — Twelve Summer Turnip Rooted, H. R. Kinney	3 00
Second, Warren Heustis & Son	2 00
Third, Arthur F. Coolidge	1 00
Onions. — Twelve specimens, W. N. Craig	3 00
Second, George D. Moore	2 00
Third, E. C. Lewis	1 00
Cucumbers. — Pair of White Spine, George D. Moore	3 00
Second, Arthur F. Coolidge	2 00
Third, H. R. Kinney	1 00
Any other variety, George D. Moore, Eureka	3 00
Cabbages. — Three of any variety, trimmed, George D. Moore, Early Spring	3 00
Second, George D. Moore, Wakefield	2 00

LETTUCE. — Four heads of any variety, George D. Moore	$2 00
Second, Warren Heustis & Son	1 00
PEAS. — Half-peck of any variety, E. C. Lewis, Nott's Excelsior	3 00
Second, Estate of Joseph S. Fay, American Wonder	2 00
Third, Elliott Moore, " "	1 00
Gratuities: —	
Estate of Joseph S. Fay, Cauliflowers	1 00
W. N. Craig, "	1 00
Warren Heustis & Son, Tomatoes	1 00
William C. Winter, "	1 00
George D. Moore, Collection	2 00

JUNE 26.

ONIONS. — Twelve specimens, George D. Moore	2 00
Second, Sumner Coolidge	1 00
SQUASHES. — Four Long Warted, Sumner Coolidge	2 00
Four Scalloped, Sumner Coolidge	2 00
CABBAGES. — Three of any variety, trimmed, George D. Moore, Early Spring	3 00
Second, George D. Moore, Wakefield	2 00
Third, Warren Heustis & Son	1 00
PEAS. — Half-peck of American Wonder, Estate of Joseph S. Fay	3 00
Second, Hon. Aaron Low	2 00
Third, H. R. Kinney	1 00
Half-peck of any other variety, George D. Moore, Henderson's 1897	3 00
Second, John L. Gardner, Nott's Excelsior	2 00
Third, E. C. Lewis, " "	1 00
Gratuities: —	
Warren Heustis & Son, Collection	1 00
John Jeffries, "	1 00
E. C. Lewis, "	1 00
George D. Moore, "	1 00
Hon. Aaron Low, "	1 00

JULY 3.

POTATOES. — Twelve specimens, Estate of Joseph S. Fay, Hebron	3 00
Second, Estate of Joseph S. Fay, Savoy	2 00
Third, Estate of Joseph S. Fay, Rose	1 00
PEAS. — Half-peck of any variety, George D. Moore, Henderson's 1897	3 00
Second, Hon. Aaron Low, American Wonder	2 00
Third, Estate of Joseph S. Fay, Advancer.	1 00

Gratuities: —

William C. Winter, Tomatoes		$1 00
Warren Heustis & Son, Collection		1 00
Hon. Aaron Low,	"	1 00
George D. Moore,	"	1 00
Arthur F. Coolidge,	"	1 00

JULY 10.

Prizes from the Levi Whitcomb Fund.

CABBAGES. — Three Drumhead, trimmed, George D. Moore, Brunswick	3 00
Second, George D. Moore, Stone Mason	2 00
BEANS. — Half-peck of Cranberry, Joshua C. Stone	3 00
Second, Isaac E. Coburn	2 00
TOMATOES. — Open culture, twelve specimens, Sumner Coolidge, Atlantic	3 00
Second, A. W. Blake	2 00

Gratuities: —

Hon. Aaron Low, Collection of Peas		1 00
I. E. Coburn,	" " "	1 00
Arthur F. Coolidge, Collection of Beans		1 00
Warren Heustis & Son, Collection		1 00
E. C. Lewis,	"	1 00
George D. Moore,	"	1 00
W. N. Craig,	"	1 00

JULY 17.

POTATOES. — Twelve specimens, Estate of Joseph S. Fay, Hebron	3 00
Second, Hon. Aaron Low, Fortune	2 00
Third, Estate of Joseph S. Fay, Rose	1 00
LETTUCE. — Four heads of any variety, John Jeffries	2 00
Second, Estate of Joseph S. Fay	1 00
SWEET CORN. — Twelve ears, Sumner Coolidge, Hybrid	3 00
Second, Sumner Coolidge, Cory	2 00
Third, Joshua C. Stone, "	1 00
TOMATOES. — Open culture, twelve specimens, Sumner Coolidge, Atlantic	3 00
Second, Arthur F. Coolidge, May's Favorite	2 00
Third, A. W. Blake, Atlantic	1 00

Gratuities: —

Nathaniel T. Kidder, Tomatoes		1 00
Warren Heustis & Son, Collection		1 00
George D. Moore,	"	1 00
Hon. Aaron Low,	"	1 00
Estate of Joseph S. Fay,	"	1 00

JULY 24.

POTATOES. — Any variety, twelve specimens, Estate of Joseph S. Fay, Hebron	$3 00
Second, Estate of Joseph S. Fay, Savoy	2 00
Third, Hon. Aaron Low, Early Essex	1 00
PEAS. — Half-peck of any variety, Hon. Aaron Low, New Life	3 00
Second, Hon. Aaron Low, Heroine	2 00
SWEET CORN. — Twelve ears of Crosby, Sumner Coolidge	3 00
Second, John C. Stone	2 00
Twelve ears of any other variety, Sumner Coolidge, Hybrid	3 00
Second, Samuel Hartwell, Cory	2 00
Third, Sumner Coolidge, Cory	1 00
TOMATOES. — Twelve specimens, Sumner Coolidge, Atlantic	3 00
Second, Isaac E. Coburn, Comrade	2 00
Third, Sumner Coolidge, Seedling	1 00
NATIVE MUSHROOMS. — Named collection of not less than five edible varieties, Miss Ellen W. Rumrill	4 00
Second, Mrs. Kate E. Parker	3 00
Third, Miss Constance Alexander and Miss Annie Scorgie	2 00
Gratuity : —	
Miss Helen M. Noyes, Collection of Mushrooms	2 00

JULY 31.

BEANS. — Two quarts of Goddard, shelled, Warren Heustis & Son	3 00
Half-peck of Horticultural, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00
Third, Joshua C. Stone	1 00
TOMATOES. — Twelve specimens of Comrade, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00
Third, Joshua C. Stone	1 00
Twelve specimens of any other variety, Sumner Coolidge, Atlantic,	3 00
Second, Arthur F. Coolidge, Atlantic	2 00
Third, Joshua C. Stone, Boston Market	1 00
EGG PLANT. — Four specimens of Round Purple, Sumner Coolidge,	3 00
Second, Arthur F. Coolidge	2 00
Gratuities : —	
Joshua C. Stone, Melons	1 00
Warren Heustis & Son, Collection	1 00
Arthur F. Coolidge, "	1 00
Hon. Aaron Low, "	1 00

AUGUST 7.

GREENFLESH MELONS. — Four specimens, Edward Russell (weight of largest specimen, 25½ lbs.)	3 00
Second, Joshua C. Stone	2 00

Sweet Corn. — Twelve ears, Joshua C. Stone	$3 00
Second, Hon. Aaron Low, Quincy Market	2 00
Third, Hon. Aaron Low, Crosby	1 00
Egg Plant. — Four specimens of Round Purple, Sumner Coolidge,	2 00
Second, Arthur F. Coolidge	1 00

August 14.

Potatoes. — Twelve specimens of any variety, Estate of Joseph S. Fay, Hebron	3 00
Second, Estate of Joseph S. Fay, Queen	2 00
Third, Estate of Joseph S. Fay, Rose	1 00
Onions. — Twelve specimens, W. N. Craig	3 00
Second, George D. Moore	2 00
Third, Warren Heustis & Son	1 00
Greenflesh Melons. — Four specimens, Joshua C. Stone	3 00
Second, Arthur F. Coolidge	2 00
Celery. — Four roots of any variety, Arthur F. Coolidge	3 00
Second, Warren Heustis & Son	2 00
Beans. — Two quarts of Large Lima, Warren Heustis & Son	3 00
Second, Sumner Coolidge	2 00
Two quarts of Goddard, shelled, Isaac E. Coburn	3 00
Second, Warren Heustis & Son	2 00
Third, Rev. Calvin Terry	1 00
Sweet Corn. — Twelve ears of Potter's Excelsior, Joshua C. Stone,	3 00
Second, Arthur F. Coolidge	2 00
Twelve ears of any other variety, P. G. Hanson, Crosby's Improved,	3 00
Second, Samuel Hartwell, Burr's	2 00
Third, Joshua C. Stone, Quincy Market	1 00
Peppers. — Twelve specimens of Squash, Arthur F. Coolidge	3 00
Second, George W. Jameson	2 00
Third, Hon. Aaron Low	1 00
Any other variety, Hon. Aaron Low, Spanish Monstrous	3 00
Second, Hon. Aaron Low, Elephant's Trunk	1 00

August 21.

Greenflesh Melons. — Four specimens, Joshua C. Stone	3 00
Second, Arthur F. Coolidge	2 00
Salmon Flesh Melons. — Four specimens, the third prize to Joshua C. Stone	1 00
Watermelons. — Pair, Joshua C. Stone	3 00
Cabbages. — Three of any variety, trimmed, Hon. Aaron Low	3 00
Second, Warren Heustis & Son	2 00
Third, Arthur F. Coolidge	1 00
Celery. — Four roots, Arthur F. Coolidge	3 00
Second, Warren Heustis & Son	2 00

BEANS. — Two quarts of Large Lima, Warren Heustis & Son . . $3 00
Second, Sumner Coolidge 2 00
Two quarts of Dwarf Lima, Warren Heustis & Son . . . 3 00
MARTYNIAS. — Twelve specimens, Hon. Aaron Low . . . 2 00
NATIVE MUSHROOMS. — Named collection of not less than five edible varieties, Miss Ellen W. Rumrill 3 00
Second, Mrs. Sarah L. Woodward 2 00

Gratuities : —
Mrs. Mary T. Goddard, Tomatoes 1 00
E. C. Lewis, Collection 4 00
Arthur F. Coolidge, Collection 2 00

SEPTEMBER 4.

Gratuity : —
Warren Heustis & Son, Paris Golden Celery 1 00

SEPTEMBER 11.

TURNIPS. — Twelve Flat, F. J. Kinney 3 00
Second, Hon. Aaron Low 2 00
Third, C. L. Hartshorn 1 00
GREENFLESH MELONS. — Four specimens, Samuel Hartwell . . 3 00
Second, E. C. Lewis 2 00
Third, E. C. Lewis 1 00
SALMON FLESH MELONS. — Four specimens, Joshua C. Stone . 3 00
Second, E. C. Lewis 2 00
Third, Joshua C. Stone 1 00
WATERMELONS. — Two specimens, Joshua C. Stone . . . 3 00
CAULIFLOWERS. — Four specimens, De Souza Brothers . . . 3 00
Second, William H. Teele 2 00
Third, Elliott Moore 1 00
LETTUCE. — Four heads of any variety, Arthur F. Coolidge . . 3 00
Second, Sumner Coolidge 2 00
Third, E. C. Lewis 1 00
CELERY. — Four roots of any variety, Warren Heustis & Son . . 3 00
Second, Arthur F. Coolidge 2 00
Third, George D. Moore 1 00
PARSLEY. — Two quarts, Arthur F. Coolidge 2 00
Second, John Jeffries 1 00
BEANS. — Large Lima, two quarts, Mrs. Mary T. Goddard . . 3 00
Second, Warren Heustis & Son 2 00
Third, E. C. Lewis 1 00
CORN. — Sweet, twelve ears of Potter's Excelsior, Rev. Calvin Terry 3 00
Second, Hon. Aaron Low 2 00
Third, Mrs. Mary T. Goddard 1 00

Any other Sweet variety, C. L. Hartshorn	$3 00
Second, O. R. Robbins	2 00
Third, Hon. Aaron Low, Champion	1 00
Egg Plant. — Four specimens of Round Purple, Sumner Coolidge,	3 00
Second, George D. Moore	2 00
Third, E. C. Lewis	1 00
Tomatoes. — Three varieties, twelve specimens each, Arthur F. Coolidge	5 00
Second, Isaac E. Coburn	4 00
Third, Hon. Aaron Low	3 00
Twelve Aristocrat, Varnum Frost	3 00
Second, Hon. Aaron Low	2 00
Third, E. C. Lewis	1 00
Twelve Comrade, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00
Third, Joshua C. Stone	1 00
Twelve May's Favorite, Varnum Frost	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, Hon. Aaron Low	1 00
Twelve of any other variety, Varnum Frost, Stone	3 00
Second, Isaac E. Coburn, Stone	2 00
Third, Isaac E. Coburn, Ignotum	1 00
Martynias. — Twelve specimens, Hon. Aaron Low	2 00
Second, George W. Jameson	1 00
Okra. — Twelve specimens, E. C. Lewis	2 00
Peppers. — Twelve specimens of Squash, Hon. Aaron Low	2 00
Second, George Lincoln	1 00
Any other variety, E. C. Lewis, Ruby King	2 00
Second, C. L. Hartshorn, Bull Nose	1 00
Native Mushrooms. — Named collection, not less than five edible varieties, Miss Helen M. Noyes	3 00
Second, Miss Ellen W. Rumrill	2 00
Gratuities : —	
W. N. Craig, three varieties of Onions	2 00
Warren Heustis & Son, Celery	1 00
George D. Moore, Collection	2 00

September 18.

Gratuities : —	
William Doran & Son, Tomatoes	1 00
Warren Heustis & Sons, Celery	1 00
Rev. Calvin Terry, Collection	1 00

September 25.

Gratuity : —	
John Jeffries, Collection	1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 30 AND OCTOBER 1.

Regular Prizes.

BEETS. — Twelve Turnip Rooted, Varnum Frost	$3 00
Second, P. G. Hanson	2 00
Third, Joshua C. Stone	1 00
CARROTS. — Twelve Long Orange, H. R. Kinney	3 00
Second, Joseph Thorp	2 00
Third, E. C. Lewis	1 00
Twelve Intermediate, H. R. Kinney	3 00
Second, Mrs. Mary T. Goddard	2 00
PARSNIPS. — Twelve Long, George D. Moore	3 00
Second, H. R. Kinney	2 00
Third, E. C. Lewis	1 00
POTATOES. — Four varieties, twelve specimens each, F. J. Kinney	5 00
Second, Mrs. Mary T. Goddard	4 00
Third, C. H. Thomas	3 00
Twelve Carman No. 1, Elliott Moore	3 00
Second, Hon. Aaron Low	2 00
Third, C. H. Thomas	1 00
Twelve Clark, F. J. Kinney	3 00
Second, C. H. Thomas	2 00
Third, Mrs. Mary T. Goddard	1 00
Twelve Hebron, F. J. Kinney	3 00
Second, E. C. Lewis	2 00
Third, Henry E. Rich	1 00
Twelve Rose, H. R. Kinney	3 00
Second, Henry E. Rich	2 00
Third, C. H. Thomas	1 00
Twelve of any other variety, F. J. Kinney, New Queen	3 00
Second, Henry E. Rich, American Wonder	2 00
Third, E. M. Bruce, New Queen	1 00
SALSIFY. — Twelve specimens, J. J. Lyons	3 00
Second, George D. Moore	2 00
Third, Warren Heustis & Son	1 00
TURNIPS. — Twelve Flat, F. J. Kinney	3 00
Second, C. H. Thomas	2 00
Third, Elliott Moore	1 00
Twelve Swedish, F. J. Kinney	3 00
Second, Joseph Thorp	2 00
ONIONS. — Twelve Danvers, W. N. Craig	3 00
Second, W. N. Craig, Yellow Globe	2 00
Third, C. L. Hartshorn	1 00
Twelve Red, W. N. Craig, Red Globe	3 00
Second, W. N. Craig, Wethersfield	2 00
Third, C. L. Hartshorn	1 00

Twelve White, C. L. Hartshorn	$2 00
Second, E. C. Lewis	1 00
Any other variety, W. N. Craig, Ajlsa Craig	3 00
Second, W. N. Craig, Prizetaker	2 00
Third, C. L. Hartshorn, "	1 00
SQUASHES. — Three Bay State, Warren Heustis & Son	3 00
Second, E. C. Lewis	2 00
Third, Hon. Aaron Low	1 00
Three Hubbard, P. G. Hanson	3 00
Second, Arthur F. Coolidge	2 00
Third, C. L. Hartshorn	1 00
Three Hybrid Turban, P. G. Hanson	3 00
Second, C. L. Hartshorn	2 00
Third, E. C. Lewis	1 00
Three Marblehead, P. G. Hanson	3 00
Second, E. C. Lewis	2 00
Three Marrow, Varnum Frost	3 00
Second, Warren Heustis & Son	2 00
Third, Arthur F. Coolidge	1 00
Any other variety, C. L. Hartshorn	3 00
Second, Benjamin K. Bliss, Pride of the Amazon	2 00
Third, Hon. Aaron Low, Plymouth Rock	1 00
WATERMELONS. — Two specimens, B. S. Nickerson	3 00
Second, Hon. Aaron Low	2 00
Third, Elliott Moore	1 00
BRUSSELS SPROUTS. — Half-peck, John Jeffries	3 00
Second, H. R. Kinney	2 00
Third, E. C. Lewis	1 00
CABBAGES. — Three Drumhead, trimmed, Hon. Aaron Low	3 00
Second, E. C. Lewis	2 00
Third, Mrs. Mary T. Goddard	1 00
Three Red, trimmed, Hon. Aaron Low	3 00
Second, Samuel Hartwell	2 00
Third, H. R. Kinney	1 00
Three Savoy, trimmed, Samuel Hartwell	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, H. R. Kinney	1 00
CAULIFLOWERS. — Four specimens, William H. Teele	5 00
Second, De Souza Brothers	4 00
Third, John McCarthy	3 00
CELERY. — Four roots of Paris Golden, best kept during the Exhibition, Warren Heustis & Son	5 00
Second, Arthur F. Coolidge	4 00
Third, C. L. Hartshorn	3 00
Fourth, E. M. Bruce	2 00
Any other variety, E. M. Bruce, Perle le Grande	5 00
Second, E. M. Bruce, New Queen	4 00

Third, Arthur Nixon	$3 00
Fourth, H. R. Kinney	2 00
ENDIVE. — Four specimens, H. R. Kinney	3 00
Second, Mrs. Haller	2 00
Third, E. C. Lewis	1 00
LETTUCE. — Four heads, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, Arthur F. Coolidge	1 00
PARSLEY. — Two quarts, John Jeffries	2 00
Second, Arthur F. Coolidge	1 00
HORSERADISH. — Six roots, H. R. Kinney	2 00
Second, George D. Moore	1 00
CORN. — Yellow or Field, twenty-five ears, traced, Elliott Moore,	3 00
Second, Henry E. Rich	2 00
Third, Henry E. Rich	1 00
Sweet, twelve ears, Isaac E. Coburn, Potter's Excelsior	3 00
Second, Mrs. E. M. Gill, Bourne's Favorite	2 00
Third, Hon. Aaron Low	1 00
EGG PLANT. — Four specimens of Round Purple, Sumner Coolidge,	3 00
Second, H. R. Kinney	2 00
Third, George D. Moore	1 00
TOMATOES. — Three varieties, twelve specimens, B. S. Nickerson	5 00
Second, Arthur F. Coolidge	4 00
Third, Hon. Aaron Low	3 00
Twelve Aristocrat, Joseph Thorp	3 00
Second, Hon. Aaron Low	2 00
Third, Isaac E. Coburn	1 00
Twelve Comrade, Isaac E. Coburn	3 00
Second, Hon. Aaron Low	2 00
Third, Joshua C. Stone	1 00
Twelve May's Favorite, Hon. Aaron Low	3 00
Twelve of any other variety, I. E. Coburn, Stone	3 00
Second, W. Warburton, Stone	2 00
Third, Joseph Thorp, Stone	1 00
PEPPERS. — Twelve specimens of Squash, Hon. Aaron Low	3 00
Second, P. G. Hanson	2 00
Third, C. L. Hartshorn	1 00
Twelve of any other variety, Hon. Aaron Low, Ruby King	3 00
Second, Hon. Aaron Low, Bull Nose	2 00
Third, C. L. Hartshorn, Bull Nose	1 00
CULINARY HERBS. — Collection, named, W. N. Craig	5 00
COLLECTION OF VEGETABLES. — Covering fifty square feet, arranged for effect, H. R. Kinney	15 00
Second, E. C. Lewis	12 00
Third, Warren Heustis & Son	10 00
Fourth, C. L. Hartshorn	8 00

Gratuities: —

Elliott Moore, White Egg Turnips	$1 00
" " Golden Hubbard Squashes	1 00
M. B. Faxon, Collection of Squashes	1 00
E. C. Lewis, Peas	1 00
Hon. James J. H. Gregory, Peas	1 00
Mrs. E. M. Gill, Lima Beans	1 00
Mrs. Mary T. Goddard, Collection of Beans	2 00
W. N. Craig, Collection	5 00
George D. Moore, "	1 00
John Jeffries, "	1 00

OCTOBER 9.

Gratuity: —

Warren Heustis & Son, Cucumbers and Celery	1 00

OCTOBER 16.

Gratuities: —

Mrs. E. M. Gill, Lima Beans	1 00
Warren Heustis & Son, Celery and Cucumbers	1 00

OCTOBER 23.

Gratuities: —

George D. Moore, Parsnips and Lettuce	1 00
Hon. Aaron Low, Salsify and Turnips	1 00

OCTOBER 30.

Gratuities: —

George D. Moore, Celery and Salsify	1 00
Warren Heustis & Son, Celery and Cucumbers	1 00

NOVEMBER 6.

Gratuities: —

John Jeffries, Parsley	1 00
Warren Heustis & Son, Celery	1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 20.

CUCUMBERS. — Pair, Francis Blake	3 00
Second, Warren Heustis & Son	2 00
Third, C. A. Learned	1 00
CABBAGES. — Three, Red, trimmed, Hon. Aaron Low	3 00
Second, Warren Heustis & Son	2 00
Third, Mrs. Mary T. Goddard	1 00
Three Savoy, Mrs. Mary T. Goddard	3 00
CAULIFLOWERS. — Four specimens, William H. Teele	3 00
Second, B. A. De Souza	2 00

Brussels Sprouts. — Half-peck, John Jeffries, Giant	$3 00
Second, John Jeffries, Dwarf French	2 00
Third, Hon. Aaron Low	1 00
Celery. — Four roots, E. C. Lewis	3 00
Second, Warren Heustis & Son	2 00
Third, Arthur F. Coolidge	2 00
Lettuce. — Four heads, George D. Moore	3 00
Second, Arthur F. Coolidge	2 00
Third, C. A. Learned	1 00
Tomatoes. — Twelve specimens, grown under glass, W. C. Winter, Stone	3 00
Second, W. C. Winter, May's Favorite	2 00
Third, W. C. Winter, Chemin	1 00
Gratuities: —	
William Warburton, Parsnips	1 00
E. C. Lewis, Collection	3 00
Warren Heustis & Son, Collection	1 00
John Jeffries, "	1 00

REPORT

OF THE

Committee on School Gardens and Children's Herbariums

FOR THE YEAR 1897.

By HENRY LINCOLN CLAPP, CHAIRMAN.

GEORGE PUTNAM SCHOOL GARDEN, ROXBURY.

The following named plants were set out in the garden during the season of 1897:

Arenaria lateriflora,
Cypripedium arietinum,
" *pubescens*,
" *spectabile*,
Geum rivale,
Viola lanceolata,
" *rostrata*.

The garden has been used as in previous years, but more extensively. Whole classes have visited it repeatedly to observe the plants, and plant material has been taken from it to be studied in the class room. Ferns and composite flowers have received the most attention. Already the pupils of the ninth grade have become quite familiar with fourteen species of ferns, which have been studied in the customary manner, — by means of lantern-slides, pressed specimens, and the ferns growing in the fernery.

Each member of the class has a notebook carefully kept, and containing pinnæ or fronds of every fern studied. Miss L. D. Ellis, a member of the class in 1896, won Mr. Davenport's first prize of fifty choice ferns, at the Herbarium Exhibition in November, 1897.

Excellent opportunities have been found for making lantern-slides from the fern crosiers in different stages of growth as seen in the fernery.

On account of the wetness of the season the plants as a whole have made exceptionally fine growths, especially the asters and golden-rods.

REPORT OF THE MEDFORD SCHOOL GARDENS.

Having once more become associated with the schools of Medford, I have during the past year made an effort to improve the Swan School Garden, and have added a large number of native plants to its flora.

Through the generosity of the Malden Park Commissioners I have been able to enrich the garden, especially the fern beds, with some twenty-five loads of peat mould from Fellsmere, and over two hundred fern roots, interspersed with asters and golden-rods, of different species, have been massed in the beds along the shady side of the fences. The rockery has been restocked with hepaticas, blood-roots, columbines, herb Robert, and other rock-loving plants, with polypodiums, woodsias, marginal shield fern and Christmas fern, and several choice native shrubs have been added to the garden. As, however, I intend adding others in the spring, and contemplate making still further efforts to establish the garden on a permanent basis of usefulness for nature study in the school, I shall not submit a special report for this year.

I wish, however, to call the attention of the Committee to the Curtis School Garden, which is beginning to assume proportions that entitle it to the highest consideration of this Committee.

Under the able supervision of Miss Amy Jones, the principal of the school, and her assistant, Miss Laura Davenport (one of the pioneers of nature work in the Medford schools), the garden has developed from a very modest beginning into a strong competitor for one of the prizes offered by this Committee, and bids fair to become a still more formidable one in the near future.

A large portion of the garden has been devoted to the usual garden flowers for the pleasure of the children, — a practice which I believe to be a wise one where only young children of the first, second, and third grades are concerned, — but some twelve native trees and shrubs and upward of fifty species of native flowering plants and ferns have been grown and made use of in the nature work in the school. Some of the nature work done from studies of these native plants by some of the youngest pupils in the school

has been of unusual excellence, and reflected great credit on the teachers and children.

Among the choice native shrubs are a seedling catalpa from the Swan School Garden, and a fine plant each of *Kalmia latifolia* (mountain laurel) and *Rhododendron maximum*, the gift of Miss Davenport, who resigned her position as teacher in the school in September, in order to assume other duties elsewhere.

The school is fortunate in having for its garden so earnest a worker as Miss Jones, who is striving to improve it in every way that she can; so helpful a sub-committee as Mr. Charles M. Jones; and so appreciative a friend as Superintendent Morss, who holds this work at its true value and encourages it all that he can.

The garden has been put into first-class condition for the winter; new beds have been made for next season's planting; the old beds have been thoroughly fertilized with rich mould, and a number of extra plants already bedded in.

It is Miss Jones's intention to make the garden more useful than ever another year, and she hopes to have some photographs made showing some of the beds and the children at their work.

Respectfully submitted,

GEORGE E. DAVENPORT.

OTHER SCHOOL GARDENS.

The school garden is being recognized in a few places, besides those already mentioned, as a valuable educational adjunct. In the spring one will be started in Stoneham and another in East Braintree. The Superintendent of Schools in the latter place has invited some member of the School Garden Committee to give a talk on the subject in that place.

The Robert G. Shaw Garden will take a new lease of life in the spring, now that the city of Boston finds itself in such a financial condition, after a wearisome period, as to warrant the grading of the grounds.

A letter on the subject of school gardens was received from a very enthusiastic principal living in one of the Gulf States. In some way he came across a copy of the Transactions of this Society, and therein saw an account of a school garden, which kindled his enthusiasm to a high pitch. He solicited advice in regard to laying out a garden an acre in extent. As that was a little

ahead of anything the Committee had contemplated. only a moderate amount of advice could be transmitted to him.

Several school gardens have been established in Trenton, N.J. At various times our reports have been sent to Professor B. C. Gregory, the Superintendent of Schools in that place, and he has sent several letters concerning what has been done in gardening there, and has promised to send a printed report giving additional details of the work.

Two sample letters to him are herewith submitted. From the simple beginnings indicated therein great things may grow; and it is with some pride that we see the influence of the Massachusetts Horticultural Society extending in this particular line to distant places.

TRENTON PUBLIC SCHOOLS,
SCHOOL NO. 8, December 15, 1897.

PROFESSOR B. C. GREGORY:

DEAR SIR: Last Arbor Day the children prepared three flower beds — two circular ones and one along the back fence. They dug out the clay and poor soil, and filled up with good soil brought from quite a distance. They then sowed seed and set out plants, which grew and were carefully looked after by the pupils. They enjoyed the flowers and took great pride in caring for them. There are three fine rose bushes, which will survive the winter, I think.

Respectfully,

M. M. WRIGHT.

TRENTON PUBLIC SCHOOLS,
SCHOOL NO. 15, GIRARD, December 17, 1897.

PROFESSOR B. C. GREGORY:

DEAR SIR: We started a garden, on either side of our school building, last spring, in which the children took a great deal of pride, and the plants were very much admired by all the neighborhood. We were a little afraid that our flowers would be interfered with during the summer, but, instead, the people in the neighborhood were careful that they should not be molested. We intend to extend the work in the spring again.

I am yours very respectfully,

ELIZABETH HUGHES.

CHILDREN'S HERBARIUMS.

It can be truly said that the children's herbariums exhibited November 26 and 27, 1897, considering the number and quality of the specimens, were the best ever placed on exhibition in Horticultural Hall.

More classes of plants were exhibited than at any previous exhibition, flowering plants leading with one thousand and twenty-nine specimens, and ferns coming next with two hundred and eleven specimens. These two classes were the largest ever seen here. Grasses, sedges, rushes, and mosses swelled the whole number to thirteen hundred and sixty-six specimens. For the exhibition of these mounts nearly all the table space in both halls was required.

The Nahant school collection was the most remarkable, both in point of numbers and the quality of the mounting. When the specimen was small by nature, many plants of the same species were artistically arranged on the sheet, so that different forms were shown and the sheet was well covered. A specimen two or three inches long looks lonesome on a sheet eleven by sixteen inches.

Among the collections that call for special mention were those of Lucy D. Ellis, Genevieve Doran, Vanessa Denton, William P. Bates, Marion C. Goward, Roscoe G. Knight, Arthur E. French, and Arthur C. Faxon. The last two exhibitors have shown nearly every common native plant, and many rare ones, during the five or six years they have exhibited.

Mr. Davenport's first prize of fifty native ferns, and the second of twenty-five, attracted marked attention. The former was won by Lucy D. Ellis, and the latter by Arthur E. French. Most fortunately, these two beautiful collections came into the possession of appreciative young botanists.

The attendance was much larger than at any previous exhibition, and in every way satisfactory.

It is remarkable that, notwithstanding the distribution of thousands of circulars and prize lists of the exhibition every year, advertising in three prominent Boston papers, and calling attention to the exhibition at teachers' conventions, so many people, teachers included, stumble as it were into the exhibition, declaring that they never knew anything about the matter before catching a glimpse of a seven-foot poster on each side of the outer door of this Hall.

PRIZES AND GRATUITIES AWARDED FOR SCHOOL GARDENS AND CHILDREN'S HERBARIUMS.

SCHOOL GARDENS.

George Putnam School, Roxbury, first prize	$15 00
Curtis School, Medford, second prize	10 00
Swan School, Medford, gratuity	15 00

CHILDREN'S HERBARIUMS.

FLOWERING PLANTS. — For one hundred and twenty-five specimens, first prize, Roscoe G. Knight	5 00
Second, Genevieve Doran	4 00
For one hundred specimens, first prize, Franklin Lewis	4 00
For seventy-five specimens, first prize, Carl M. True,	3 00
For fifty specimens, first prize, William P. Bates	2 00
Also first, Vanessa Denton	2 00
Gratuities: —	
Nahant School, for school collection of one hundred and eighty-four specimens	6 00
Marion C. Goward, for one hundred and twenty-five specimens	4 00
Arthur C. Faxon, for ninety-five specimens	4 00
Olive E. French, for fifty specimens	1 50
Arthur E. French, for forty-four additions	5 00
FERNS. — For twenty-five specimens, first prize, Marion C. Goward	4 00
For fifteen specimens, first prize, Roscoe G. Knight,	3 00
For ten specimens, first prize, Ada K. Wood	2 00
Second, Olive E. French	1 00
For five specimens, first prize, Clara Hathaway	75
GRASSES.	
Gratuities: —	
Arthur E. French, for eight additions	2 00
Arthur C. Faxon, for two additions	50

SEDGES.

Gratuities: —

Arthur E. French, for two additions	$2 00
Arthur C. Faxon, for five additions	1 00

RUSHES.

Gratuity: —

Arthur C. Faxon, for eight specimens	2 00

LEAF SPRAYS. — For thirty-six sheets, first prize, J. Stanley Webb 3 00

Second, Katharine A. Dwyer	1 00

Gratuities: —

Arthur C. Faxon, for ten additions	1 00
Philip G. Clapp, for ten sheets	50
Total for Herbariums and Gardens	$104 25

The amount of money appropriated by the Society for the use of this Committee was		$250 00
Awarded for School Gardens	$40 00	
Awarded for Herbariums	64 25	
Suffolk Engraving Company (cuts)	10 05	
Printing	42 62	
Advertising	19 60	
Paper	6 21	
Expressage, posters, stamping, etc.	8 50	
		191 23
Balance unexpended		$58 77

HENRY L. CLAPP, Roxbury,
Mrs. H. L. T. WOLCOTT, Dedham,
GEORGE E. DAVENPORT, Medford,
Miss KATHARINE W. HUSTON, Roxbury,
Mrs. P. D. RICHARDS, West Medford,
WILLIAM P. RICH, Chelsea,
W. E. C. RICH, *Secretary*,
99 Moreland st., Roxbury, Mass.,

Committee on School Gardens and Children's Herbariums.

REPORT

OF THE

COMMITTEE OF ARRANGEMENTS

FOR THE YEAR 1897.

The year just about closing has been, as usual, quite gratifying to your Committee, for the reasons that the exhibitions all through the season have been very full, and an unusual interest has been manifested by a large number of new exhibitors. This is greatly to be commended, for the constant addition of new life to any working institution is desirable, since by these additions we come in contact with new and improved modes of cultivation, which are sometimes great improvements over the old methods, and add to our exhibitions an interest which they would not have had except by this new life which is constantly being added by the initiation of new members.

We are also pleased to note the unflagging interest of the gardeners in our shows, for without their hearty coöperation our shows would be utter failures. We are under great obligations to them for their industry and zeal, and we try to repay them, in part, by expending a portion of our appropriation for their comfort and enjoyment.

It is also pleasant to record the great success of the Mycological Club, an auxiliary to our Society, and the enthusiasm manifested by the members in making their shows of wild fungi as large and complete as possible. Their exhibitions have added very largely to the knowledge of the edible species of this class of vegetables, much to the gratification of the lovers of mushrooms.

Taking the Schedule of Prizes as the basis for our action, the halls, tables, etc., have been so arranged as best to bring into view the various collections at each exhibition, and the exhibitors have coöperated so well with your Committee that there has not been any friction or adverse comment on the allotment of space.

This is very gratifying when we take into consideration the very crowded and limited accommodations we have at some of our shows.

We are under still another obligation to our friend Jerome Jones, Esq., for the loan of three very large and elegant china vases for the display of chrysanthemums in November, thus giving us eight large vases to meet all the entries made for these particular prizes.

The exhibitions this year have been quite as numerous as during any former year, and yet at only two of them, the Spring and Chrysanthemum Shows, has any admittance fee been charged. At the end of this report will be found an account of the receipts derived from these exhibitions. These are not as much as your Committee would desire, and surely not nearly as much as it would expect with better accommodations. We are under obligations to the newspapers for copious reports of our shows, but we should be under much greater obligations if they would tell the public what to expect before the shows take place, thereby giving the people an inkling of what is to come off before the shows are all over.

The arrangements of plants and flowers at the different shows have been varied so as to produce the most pleasing effect as a whole, taking into consideration that none of your Committee knows what will be sent in till the contributions reach the hall.

The chairmen of other committees will tell you about the progress we are making in our noble art, and we trust their reports will be read with interest, pleasure, and profit by all our members.

Receipts at Spring Exhibition	$319 75
Receipts at Chrysanthemum Show	654 50
	$974 25

all of which is in the Treasury of the Society.

Respectfully submitted,

JOS. H. WOODFORD,
Chairman.

REPORT OF THE DELEGATE

TO THE

STATE BOARD OF AGRICULTURE

FOR THE YEAR 1897.

It was stated in a previous report that the work of the State Board of Agriculture was divided among sub-committees of the members. The work of the Committee on Gypsy Moth, Insects, and Birds would seem to have special interest for this Society. The present facilities for travel and transportation enable collectors to visit every habitable part of the globe in search for new species and varieties of fruits, flowers, vegetables, ornamental trees and shrubs, with the constant danger of bringing their insect enemies with them. Foreign countries have found it necessary to pass stringent laws requiring all nursery stock to be inspected before being planted or distributed.

Two insects which have proved most destructive in foreign countries have recently been introduced into this State,— the Gypsy Moth and the Brown-tailed Moth. The former was brought here by a Frenchman who, having some knowledge of entomology, thought that by cross-breeding he could produce a more hardy silk-worm than the common species. While carrying on his experiments some of the caterpillars escaped and soon became a serious pest in the neighborhood. He resided in the southern portion of Medford; his neighbors had small places with gardens of limited area containing the usual garden fruits. In 1889 the caterpillars appeared in such quantities as to defy all attempts to destroy them by individual effort. The shade trees in the streets were stripped of their foliage and the fences and the sides and roofs of the houses were covered with the caterpillars. They entered the houses, secreting themselves in the closets and in the beds. The citizens called a special town meeting and appropriated three hundred

dollars, and instructed the Road Commissioners to protect the shade trees. Without experience or the facilities for prosecuting the work, they made little progress. The residents of the infested and adjacent territory decided to petition the Legislature to assist in controlling and, if possible, exterminating this destructive pest. The Governor of the State resided in the infested territory, and in his annual message, January, 1890, called the attention of the Legislature to the matter. Petitions from the Selectmen of Medford and the adjoining towns, Arlington, Everett, Winchester, Stoneham, and Wakefield, from the city officials of Malden and Somerville, the State Board of Agriculture, and the Massachusetts Horticultural Society, were presented to the Legislature in January, 1890. The matter was referred to the Committee on Agriculture. The Committee visited the infested locality and reported that they saw walls of buildings and almost every tree covered with the egg clusters or nests.

The Legislature of 1890 enacted a law providing for the appointment of a commission to take charge of the work "to provide and carry into execution all possible measures to prevent the spread and secure the extermination of the *Ocneria dispar* or Gypsy Moth in this Commonwealth." The Legislature appropriated twenty-five thousand dollars, and the Governor appointed a commission consisting of three men, all residents of the infested territory. They commenced work immediately and killed large quantities of the caterpillars, paying special attention to the trees by the roadsides to prevent their being distributed by passing carriages. The Commission soon found that the money appropriated would not complete the work over the known infested territory, which was supposed to be about a mile and a half long and two-thirds of a mile wide, and the Legislature appropriated twenty-five thousand dollars more. The work of spraying was continued as long as the insect continued in the caterpillar state, and afterwards the eggs were destroyed.

In the spring of 1891 the Governor discharged the Commission and the Legislature passed an act placing the work of attempting "to prevent the spreading and to secure the extermination of the Gypsy Moth" in the hands of the State Board of Agriculture, and appropriated fifty thousand dollars to carry on the work.

The efforts of the Committee the first year were directed to destroying as many as possible of the insects where they were liable

to do the most injury; to cleaning the trees bordering the highways, and scouting to ascertain the outside limits of the area infested. During the year scattered colonies were found in thirty-one different towns and cities, bounded as follows: South by Boston and all the towns bordering on Massachusetts Bay to Beverly; on the east by Beverly, Danvers, and Reading; on the north by Bedford, Lexington, and Waltham, and on the west by Waltham and Watertown.

It was then determined that a line drawn on the outside limits of the above towns enclosed the infested territory, and from that time to the present only three colonies have been found outside the above-named limits. Two colonies have been found in Brookline and one in Lincoln.

It will not be understood that all the above territory was infested, but scattered colonies were found, diminishing in number in proportion to the facilities for transportation and the distance from the centre at Medford.

The plan of work pursued from the beginning has been to work from the outside towards the centre for extermination, and reduce the infested area, and, as far as means allowed, to reduce the numbers in the central portions, and to clean trees bordering highways and railroads.

The Committee have each year at the close of the season made a careful survey of the work done and to be done, and if the work was to be continued asked for the least amount of money to do the work absolutely necessary when viewed from an economic standpoint. These estimates have been reduced by the Legislature from one-third to one-half, thus causing a change of plans by which portions of the territory must be neglected; and so rapidly does this insect increase, that small colonies become large ones, and others that were greatly reduced, not only regain their former number and extent of ground occupied, but add largely to both.

As an illustration of the fecundity of this insect, I will mention one instance. While making an examination of one of the woodland colonies the past season, an oak tree ten inches in diameter, and from forty to fifty feet in height, was noticed as being thickly covered with nests, and the workmen were requested to count these nests as they destroyed them, and report the number. They reported two thousand and seventy. It has been found by the

examination of these nests that they contain on the average between five and six hundred eggs. This single tree was carrying through the winter a prospective increase of one million and thirty-five thousand caterpillars in one year. It has been found that ten full-grown caterpillars weigh an ounce, but allowing twenty to the ounce, the above number would weigh more than one and one-half tons. They are omnivorous, eating the foliage from every known tree, plant, and vegetable. They commence hatching about the twentieth of April, and continue until the middle of June, and feed until the last of July.

Strong colonies, if undisturbed, will kill most deciduous trees in two years, and evergreen trees in one year. They not only destroy the first foliage, but continue as the trees put forth new foliage to devour it until the last of July.

The difficulty, if not the impossibility, of controlling this insect by ordinary methods has been illustrated in many instances. General Lawrence, of Medford, stated before a committee of the Legislature that he spent more than three thousand dollars in a single season in his efforts to protect his own premises, but failed, and was obliged to call on the State employees for assistance.

Congress, at its last session, passed an act requiring the United States Department of Agriculture to make an investigation of the gypsy moth in Massachusetts. In accordance with that act, L. O. Howard, the head of the Entomological Division, has spent several weeks in making a thorough examination of the whole territory and the methods of work employed by the Committee for the extermination of this insect. His report is now in the publisher's hands, and will soon be issued, and may be relied upon as the judgment of one of the most expert economic entomologists in the country.

This war on the gypsy moth is not for the protection of Massachusetts alone, for if the work is discontinued, and they are allowed to increase along the highways and railroads, they must inevitably be carried into other States; and, judging from our experience in Massachusetts, we shall have the most dangerous and destructive national insect pest ever introduced into this country.

E. W. Wood,
Delegate.

REPORT

TO THE

STATE BOARD OF AGRICULTURE

FOR THE YEAR 1897.

By GEORGE CRUICKSHANKS, OF FITCHBURG.

In 1829 the Massachusetts Horticultural Society was organized to encourage the science and art of horticulture. How well it has fulfilled its mission may be seen at the exhibitions that are held at its beautiful hall on Tremont Street almost every Saturday during the year. Besides the Annual Spring, Rhododendron, Rose and Strawberry, Plant and Flower, Fruit and Vegetable, and Chrysanthemum Shows, prizes are offered every week during the summer and autumn months for the choicest products of the gardener's skill. The amount appropriated this year for premiums and gratuities was $8,100.

The year began with a course of Lectures and Discussions on the following subjects:

January 9. Tropical Horticulture, with Illustrations of the Principal Economic Plants of Hot Climates, by Professor George L. Goodale, Cambridge.

January 16. The Structure and Classification of Mushrooms, by Hollis Webster, Cambridge.

January 23. The Chrysanthemum; its Past, Present, and Future, by Edmund M. Wood, Wellesley.

January 30. Plant Beauty, by Henry T. Bailey, North Scituate.

February 13. Sweet Peas, by Rev. W. T. Hutchins, Indian Orchard.

February 20. Market Gardening, by T. Greiner, La Salle, N.Y.

February 27. Good Food from the Garden, by Miss Anna Barrows, Boston.

March 13. Horticulture in Canada, by Professor William Saunders, Ottawa, Canada.

March 20. Soils and Potting, by T. D. Hatfield, Wellesley.

March 27. The Spread of Plant Diseases; a consideration of some of the ways in which Parasitic Organisms are disseminated, by Dr. Erwin F. Smith, Washington, D.C.

The lectures and discussions are published in full in the Transactions of the Society, which are free to all the members of the Society.

The Spring Exhibition opened March 23 and continued four days. The Lower Hall contained a fine show of early vegetables and winter apples and pears. In the centre of the hall was a rich display of spring flowering greenhouse plants. In the Upper Hall were choice collections of spring flowering bulbs, which included the fragrant hyacinth, tulips, jonquils, narcissuses, and polyanthuses. There were excellent exhibits of perennials, cinerarias, cyclamens, and pansies, and a fine show of orchids.

The Rhododendron Show opened June 3 for two days. The rhododendrons and azaleas were very fine. Fine exhibits were made of carnations, foxgloves, oriental poppies, etc. There were large collections of native plants and an excellent display of orchids. One table was filled with a choice collection of vegetables. A tomato plant grafted on a potato and bearing potato tubers at the bottom and a tomato at the top attracted much attention.

The Rose and Strawberry Show was held June 22 and 23. The exceedingly cold and rainy spring was not favorable to the growth of the best quality of either fruit or flowers; consequently the display was not large and the quality was not as good as in some former years. In strawberries the Marshall took the lead in size and quality. Beautiful collections of orchids were shown; also a very fine specimen (trained) of Bougainvillea, large collections of rhododendrons, and an exhibit of seventy-two varieties of pæonies.

The Annual Exhibition of Plants and Flowers was held September 1 and 2. All lovers of flowers look forward to this annual plant and flower show. The Upper Hall was devoted to pot plants. Much credit is due the Committee of Arrangements for the taste

shown in arranging the pot plants in groups on the floor of the hall. All the stove, greenhouse, and foliage plants were in the best possible condition. The tanks of water plants near the entrance to the Upper Hall were very much admired. The Lower Hall was devoted to a splendid display of cut flowers. There was a very large show of dahlias on the tables and a solid bank on the platform at the end of the hall. Large collections of zinnias, marigolds, dianthuses, French cannas, native flowers, etc., were shown. The annual plant and flower show of 1897 was one of the best held by the Society.

The Annual Exhibition of Fruits and Vegetables began September 30, to hold two days. The show of apples was not as large as that of some years, but many fine specimens were on the tables, the Roxbury Russet, Washington Strawberry, and McIntosh Red being worthy of special mention. The show of pears was very fine, and many of the varieties were fully up to the high standard held by this Society. Peaches were excellent. Native grapes were good, notwithstanding the cold and rainy season. A novelty in the exhibition was a collection of seventeen varieties of edible nuts. The display of vegetables was abundant and of excellent quality. One long table was devoted to the squash family; another to potatoes, beets, onions, parsnips, and carrots. There was an interesting collection of culinary herbs, comprising twenty varieties, many of which are seldom seen at our exhibitions.

The Chrysanthemum Show began November 2, to continue four days. The Upper Hall was given up to the display of pot plants placed in groups on the floor. Here the gardener had a chance to show his taste in arranging for effect, each being allowed one hundred square feet. The plants were all well grown, and good taste was shown in the arrangement. The Lower Hall was devoted to the cut flowers on tables and in vases, every available space being filled with the finest display of the chrysanthemum ever shown in Horticultural Hall. Besides the chrysanthemums there was a fine show of orchids and carnations.

Respectfully submitted,

GEO. CRUICKSHANKS,

Inspector.

REPORT

OF THE

COMMITTEE ON THE LIBRARY

FOR THE YEAR 1897.

As usual, we find little to say about the affairs of the Library; the same report would suffice year after year with the alteration of a few words. The sums of money which we have received from the Society and from the income of the Stickney Fund have been expended in the usual way, and the increase of the Library by purchase has been about the same as in previous years. The Librarian's list will contain all the titles, and it is not necessary, therefore, to make especial mention of many. The most important of the works which we have been receiving part by part, Sargent's "Silva of North America," is now complete with the exception of two volumes, one of which will probably be at hand by the end of the year.

The books and pamphlets which we have obtained otherwise than by purchase have been as numerous as those we have bought; and we would make especial mention of a beautiful book presented by Mr. James Herbert Veitch, F.L.S., F.R.H.S., of the firm of James Veitch & Sons, descriptive of his journeys in the East and in Australia and New Zealand. The work is very valuable, not only for its text, but its illustrations, and is, moreover, a book which we could not easily have come by, since it was printed for private circulation only and not for distribution by the trade.

A year ago we stated that the regular force of the Library would probably be able to do the needful work upon the card catalogue of plates in the future. This expectation seems to have been well founded, and much of this work has been done in the past year. We regard this catalogue as a possession as valuable as it is unique; when we look at this great array of drawers

filled with cards, many of which contain three or four references, and remember that not one of these hundreds of thousands is included in Pritzel's Index, we see at a glance one proof of the completeness of our library and its accompanying key, which fully doubles its value. One thing more is lacking, which we hope may some day be supplied; namely, a similar index to subjects.

In regard to the suggestion made during the present year "that the Committee on the Library shall make a rule limiting the time during which books can be kept from the Library room," we wish to say that Regulations for the Library were adopted on the 13th of March, 1830; which regulations were revised in 1846 and again in 1861. In every case they included a rule fixing the time during which books taken from the Library might be kept. These rules provide that a copy shall be affixed to every book, and that this is done may be seen by any one who will take the trouble to examine.

For the Committee,

W. E. Endicott,
Chairman.

REPORT

OF THE

SECRETARY AND LIBRARIAN

FOR THE YEAR 1897.

In attempting to write a report of the work in this department during the year now closing, I am confronted with the same difficulty which has been encountered in former years — the fact that the work of one year is so similar to that of another, though never precisely the same in its details, that the report of one year must necessarily bear a strong general resemblance to that of another.

The Schedule of Prizes was, as I hoped when I presented my last report that it would be, ready and sent by mail with other documents to every member some days before the close of the year, and I trust that we may be able to do the same with the Schedule for 1898.

The publication, since my last report, of the List of Library Accessions in a separate pamphlet, as Part III. of the Transactions for 1895, affords a better opportunity than ever before to judge of the rapidity with which the Library is growing. The first publication of the full list of additions to the Library was in 1860, when it filled about two pages; in 1895 it filled sixty pages. Since my last report Part II. of the Transactions for 1896 has also been completed and published. As soon as I could see my way through these two publications, that of Part I. for 1897 was taken in hand. Four of the lecturers in the winter course having taken their papers home for revision, the first thing to be done was to recall these, and this was attempted early in June. One was received quite promptly; another, after three written requests, came to hand about the first of August, and a third a little later; but the fourth, notwithstanding many and urgent requests, was received only yesterday. Being one of the earliest in the course, it blocked the printing of all

the others; but the beginning of that part of the Transactions is now in the printer's hands and it will be completed as speedily as possible.

In my report as Librarian for 1895 I remarked that the work of binding the Agricultural Newspapers, which for the previous five years had been preserved as permanent additions to the Library, should not be much longer delayed. I am glad to be able now to report that during the present year sixty-two volumes of this class have been bound. Although this is not a great number, and though the cheapest bindings consistent with strength and durability were selected, the books were of so large size that the expense absorbed a considerable part of the library appropriation. The next heavy work in the way of binding is our large collection of Experiment Station Reports; this will be done as soon as time and funds permit.

The great interest in mushrooms the last two or three years induced the Library Committee to add to those already in the Library a selection of works on that subject, some of which are illustrated with colored plates. These books have afforded much gratification to members of the Society and others who are studying that class of plants.

Among other additions to the Library is a volume containing the anniversary addresses and other publications of the Society from its beginning in 1829 to 1837 inclusive. Although the Society already possessed copies of all these publications, interest is added to this volume by the fact that the pamphlets containing them were collected by the first President, General Dearborn, and that the volume has a title page, preface, and table of contents in his handwriting, the preface being signed by him and giving an account of the inception of the Society and the establishment by it of Mount Auburn Cemetery. There is also a copy of two circulars sent out to call the meetings which resulted in the formation of the Society, and a copy of the Order of Exercises at the Consecration of Mount Auburn. This unique volume was the gift of Edward C. R. Walker, whose lamented death on the 11th of October last has added to its value.

The work of completing imperfect sets has been steadily pursued. Our set of the Farmer's Magazine in ninety-three volumes, London, 1834–1881, has been completed by the fortunate purchase of the first nine volumes. In years past we have printed in connection

with the List of Library Accessions a list of books, etc., wanted, the last having been in 1883. It has every year since then been my desire to print another, but it has been omitted because the time required to prepare it would delay the publication of the Transactions. But with the publication of the Library Accessions in a separate pamphlet this objection no longer existed, and accordingly such a list was included in that pamphlet, and many of the books in it have already been procured, especially the publications of the United States Department of Agriculture, making our set of those publications complete with very few exceptions.

The extension of the usefulness of the Library among members of the Society and others has been kept constantly in mind, and a circular, intended to promote this object, signed by the President, was sent to every member of the Society and a large number of its correspondents, and still wider circulation was given to it by some of the leading horticultural and daily newspapers.

No special appropriation for the work on the Card Catalogue of Plates was made this year, but it has been carried on as far as possible by those regularly employed here.

One of the most vital portions of the Library, which makes us sharers in the horticultural progress of the day, is the periodicals supplied by the Society's appropriation, and by exchange for our own publications. These, which are ever growing in number, not only keep us informed as to the latest discoveries in horticulture, but when bound form a valuable, and not inconsiderable, permanent part of the annual accessions; indeed, with other publications received by donation and exchange, they constitute the bulk of these annual additions. Another most valuable class of books is supplied by the Stickney Fund, but the interest of the Society in this fund expires with the present year, and it is much to be hoped that among the members and friends of the Society there may be found one possessing the means and disposition to establish a fund for the increase of the Library, which shall take the place of the Stickney Fund, and shall be a perpetual possession.

The fact that only three weeks after the organization of the Society a Committee on the Library was established to collect books, drawings, engravings, etc., relating to horticulture, shows the estimate attached by the founders of the Society to the importance of a library. After a time, however, the interest in the Library seemed to flag, but later, owing to the diligent

labors of the Library Committee and the gift of Mr. Stickney, it was revived, and the Library may now claim to be of fully equal importance with any department of the Society; indeed, as an educational influence, it may justly claim greater importance than any other department. The Library and the annual courses of lectures, only, can give the Society any claim to be considered a scientific institution. No more beautiful sight is afforded anywhere, or at any time, than the specimens of plants, flowers, fruits, and vegetables contributed in such perfection to the various exhibitions of this Society; but though they may excite in the beholders a desire to go and do likewise, in themselves they afford no information how to do it. The money spent in prizes and gratuities for these beautiful productions is doubtless productive of much good, but its permanent benefit, both to individuals and to the Society, is but small compared with that derived from a well stocked and carefully selected library, for that benefit is permanent and continually increasing.

The Library of the Royal Botanic Gardens, at Kew, is thought to be the best botanical library in the world, and there can be no better judge of such a library, both from a practical and scientific point of view, than Mr. George Nicholson, the Curator of the Gardens, author of the "Illustrated Dictionary of Gardening," and a Corresponding Member of this Society. When looking over our Library a few years ago, he exclaimed, "It is wonderful — it is wonderful — it is something that not only the State, but the whole nation, should be proud of!"

ROBERT MANNING,
Secretary and Librarian.

DECEMBER 18, 1897.

TREASURER'S REPORT

FOR THE YEAR 1897.

MASSACHUSETTS HORTICULTURAL SOCIETY *in account current to December 31, 1897, with* CHARLES E. RICHARDSON, *Treasurer.*

DR.

To amount paid on account of Library in 1897:			
For books, periodicals, and binding . . .		$400 00	
From income of Stickney Fund for books	$733 54		
Less amount received from sale of duplicate books	50 00		
		683 54	
			$1,083 54
To amounts paid Interest on Funds for Prizes credited opposite			1,892 72
To amounts paid Interest on Loans			928 50
To Prizes awarded in 1896 paid in 1897 as follows:			
For Plants		$1,963 53	
" Flowers		2,528 19	
" Fruits		1,476 00	
" Vegetables		1,071 00	
" Gardens and Greenhouses		480 00	
" Hunnewell Prizes for Rhododendrons . .		105 00	
			7,623 72
To amount paid Committee on School Gardens and Children's Herbariums			191 23
" " Salaries, Secretary, Assistants, and Treasurer		$4,200 00	
" " Salaries of Committees . . .		1,351 00	
" " Services on Transactions . . .		107 00	
" " Committee of Arrangements . .		400 00	
" " Insurance		1,004 70	
" " Repairs		248 76	
" " Furniture and Exhibition Ware .		657 34	
" " Heating		968 62	
" " Lighting		591 38	
" " Water Rates		354 00	
Amounts carried forward		$9,882 80	$11,719 71

Amounts brought forward	$9,882 80	$11,719 71
To amount paid Publication and Discussion	280 00	
" " Stationery, Printing, and Postage	1,370 30	
" " Taxes	2,756 00	
" " Legal Services	1,170 00	
" " Incidentals	679 78	
" " Labor, including Janitor's Salary	2,678 97	
" " Annual Exhibitions, Expenses	462 57	
" " H. H. Hunnewell	1,000 00	
" advanced to A. P. Loring, Executor	15,000 00	
		35,280 37
		$47,000 08
Balance of Cash, December 31, 1897		6,664 89
		$53,664 97

CR.

By Balance of account rendered December 31, 1896			$6,600 61
Received from Building in 1897, viz.:			
Rents of Stores	$15,931 67		
" Halls	2,050 00		
		$17,981 67	
Received Income from Mount Auburn		4,682 64	
" Massachusetts State Bounty		600 00	
" Admissions and Assessments		1,132 00	
" Annual Exhibitions, Gross Receipts		974 25	
" Interest on Bonds	$1,075 00		
" " Bank Balance	44 58		
" " other sources	110 00		
		1,229 58	
" from sales of Transactions		2 00	
" " H. H. Hunnewell, prizes for 1896		32 00	
" " Heating		338 50	
" " Water Rates		199 00	
" Interest credited following Funds charged opposite:			
Samuel Appleton Fund	$50 00		
John A. Lowell Fund	50 00		
Theodore Lyman Fund	550 00		
Josiah Bradlee Fund	50 00		
Benjamin V. French Fund	25 00		
H. H. Hunnewell Fund	200 00		
W. J. Walker Fund	117 72		
Levi Whitcomb Fund	25 00		
Benjamin B. Davis Fund	25 00		
Marshall P. Wilder Fund	50 00		
John Lewis Russell Fund	50 00		
Josiah Stickney Fund, as agreed	700 00		
		1,892 72	
Notes Payable		18,000 00	
			47,064 36
			$53,664 97

CHAS. E. RICHARDSON,
Treasurer.

Approved:

H. H. HUNNEWELL,
A. HEMENWAY,
FRANCIS H. APPLETON,
} *Finance Committee.*

ASSETS AND LIABILITIES OF THE MASSACHUSETTS HORTICULTURAL SOCIETY.

DECEMBER 31, 1897.

ASSETS.

Real Estate		$250,000 00	
Stereotype Plates and copies of History		257 00	
Chicago, Burlington & Quincy R.R. Bonds		1,000 00	
Sinking Fund		23,872 50	
Kansas City, Clinton & Springfield R.R. Bonds		1,980 00	
Furniture and Exhibition Ware		7,650 75	
A. P. Loring, Executor		22,500 00	
Library		36,980 78	
Due from Tenants		2,641 79	
Cash		6,664 89	
			$353,547 66

LIABILITIES.

Mortgage			$1,000 00	
Notes Payable			18,000 00	
Josiah Stickney Fund, payable to Harvard College in 1899			12,000 00	
Unexpended balance of Josiah Stickney Fund			32 74	
Prize Funds invested in Building, viz.:				
Samuel Appleton Fund,	$1,000 00			
John A. Lowell "	1,000 00			
Theodore Lyman "	11,000 00			
Josiah Bradlee "	1,000 00			
Benjamin V. French "	500 00			
William J. Walker "	2,354 43			
Levi Whitcomb "	500 00			
Benjamin B. Davis "	500 00			
H. H. Hunnewell "	3,000 00			
		$20,854 43		
Prize Funds invested in Bonds:				
H. H. Hunnewell Fund,	$1,000 00			
Marshall P. Wilder "	1,000 00			
John Lewis Russell "	1,000 00			
		3,000 00		
			23,854 43	
Prizes for 1897, payable in 1898			8,100 00	
				62,987 17
Surplus				290,560 49
				$353,547 66

CHAS. E. RICHARDSON,
Treasurer.

Membership Account of the Massachusetts Horticultural Society, December 31, 1897.

Life Members per last report	554		
Added in 1897	15		
Commuted from Annual	6		
		575	
Deceased		26	
			549
Annual Members per last report	212		
Added in 1897	19		
		231	
Commuted to Life	6		
Deceased	2		
Resigned	5		
Dropped for non-payment, two years	6		
		19	
			212
Present Membership			761

INCOME FROM MEMBERSHIP.

15 new Life Members @ $30	$450 00
19 new Annual Members @ $10	190 00
6 commuted to Life @ $20	120 00
Annual Assessments	372 00
	$1,132 00

CHAS. E. RICHARDSON,
Treasurer.

Dr. *Massachusetts Horticultural Society in account with the Proprietors of the Cemetery of Mount Auburn.* Cr.

For Sales and Improvements within the Cemetery for the year ending December 31, 1897.

To cost of filling up and improving land at Mount Auburn for the year ending December 31, 1897:			By sales in January		$91 60
Vinca Path and Maple Avenue	$466 50		" " February		40 00
Yew and Fountain Avenues	2,027 62		" " March		1,470 00
	$2,494 12		" " April		760 00
One-quarter of $2,494.12 is	$623 53		" " May		2,504 77
Omitted, account, 1896	19 50		" " June		836 00
		$643 03	" " July		1,447 00
Balance due Mass. Horticultural Society		4,682 64	" " August		852 00
			" " September		1,520 00
			" " October		1,560 00
			" " November		9,823 33
			" " December		690 00
					$21,594 70
			Net amount received from Receiving Tomb		1,133 00
					$22,727 70
			Less grave repurchased		25 00
					$22,702 70
			Deduct for annual expenses		1,400 00
					$21,302 70
		$5,325 67	Mass. Horticultural Society ¼ part of $21,302.70		$5,325 67

E. & O. E.

H. B. MACKINTOSH, *Treasurer.*

December 31, 1897.

MASSACHUSETTS HORTICULTURAL SOCIETY

To the PROPRIETORS OF THE CEMETERY OF MOUNT AUBURN, *Dr.*

For one-fourth part of the following expenditures for grading new lands for sale during the year 1897 :

Vinca Path and Maple Avenue.

34 days, men	$76 50	
104 days, man and horse	390 00	
		$466 50

Yew and Fountain Avenues.

198½ days, men	$446 06	
421½ days, man and horse	1,581 56	
		2,027 62
		$2,494 12
One-fourth of $2,494.12 is		$623 53

Signed, JAMES C. SCORGIE,
Superintendent Mount Auburn Cemetery.

DECEMBER 31, 1897.

I certify the foregoing to be a true copy of improvements for the year 1897 rendered by the Superintendent.

H. B. MACKINTOSH,
Treasurer.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1898.

President.

FRANCIS H. APPLETON, of Peabody.

Vice-Presidents.

CHARLES H. B. BRECK, of Brighton.
BENJAMIN P. WARE, of Clifton.
WALTER HUNNEWELL, of Wellesley.
SAMUEL HARTWELL, of Lincoln.

Treasurer and Superintendent of the Building.

CHARLES E. RICHARDSON, of Cambridge.

Secretary and Librarian.

ROBERT MANNING, of Salem.[1]

Professor of Botany and Vegetable Physiology.

BENJAMIN M. WATSON, of Jamaica Plain.

Professor of Entomology.

SAMUEL H. SCUDDER, of Cambridge.

Delegate to the State Board of Agriculture.

E. W. WOOD, of West Newton.

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[1] Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

STANDING COMMITTEES.

Executive.

THE PRESIDENT, FRANCIS H. APPLETON, CHAIRMAN.

THE CHAIRMAN OF THE FINANCE COMMITTEE, H. H. HUNNEWELL, *Ex officio*.

WILLIAM C. STRONG. BENJAMIN C. CLARK.
WILLIAM H. SPOONER. WALTER HUNNEWELL.
NATHANIEL T. KIDDER. CHARLES W. PARKER.
CHARLES F. CURTIS.

Finance.

H. HOLLIS HUNNEWELL, OF BOSTON, CHAIRMAN.
FRANCIS H. APPLETON. AUGUSTUS HEMENWAY.

Lectures and Publication.

BENJAMIN M. WATSON, OF JAMAICA PLAIN, CHAIRMAN.
JAMES H. BOWDITCH. AARON LOW.

Library.

WILLIAM E. ENDICOTT, OF CANTON, CHAIRMAN.
GEORGE W. HUMPHREY. GEORGE E. DAVENPORT.
WALTER S. PARKER. CHARLES W. SWAN.

Plants.

AZELL C. BOWDITCH, OF SOMERVILLE, CHAIRMAN.
JAMES COMLEY. WILLIAM J. MARTIN.
JAMES WHEELER. ARTHUR H. FEWKES.

Flowers.

J. WOODWARD MANNING, OF READING, CHAIRMAN.
MICHAEL H. NORTON. FREDERICK S. DAVIS.
KENNETH FINLAYSON. GEORGE E. DAVENPORT.

Fruits.

E. W. WOOD, OF WEST NEWTON, CHAIRMAN.
CHARLES F. CURTIS. WARREN FENNO. J. WILLARD HILL.
O. B. HADWEN. SAMUEL HARTWELL. SUMNER COOLIDGE.

Vegetables.

CHARLES N. BRACKETT, OF WATERTOWN, CHAIRMAN.
CEPHAS H. BRACKETT. VARNUM FROST. WALTER RUSSELL.
P. G. HANSON. WARREN H. HEUSTIS. AARON LOW.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1898.

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CHARLES F. CURTIS.

Finance.

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FRANCIS H. APPLETON. AUGUSTUS HEMENWAY.

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JAMES H. BOWDITCH. AARON LOW.

Library.

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JAMES WHEELER. ARTHUR H. FEWKES.

Flowers.

J. WOODWARD MANNING, OF READING, CHAIRMAN.
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KENNETH FINLAYSON. GEORGE E. DAVENPORT.

Fruits.

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CHARLES F. CURTIS. WARREN FENNO. J. WILLARD HILL.
O. B. HADWEN. SAMUEL HARTWELL. SUMNER COOLIDGE.

Vegetables.

CHARLES N. BRACKETT, OF WATERTOWN, CHAIRMAN.
CEPHAS H. BRACKETT. VARNUM FROST. WALTER RUSSELL.
P. G. HANSON. WARREN H. HEUSTIS. AARON LOW.

Gardens.

PATRICK NORTON, of Dorchester, Chairman.
CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND ARRANGEMENTS, *Ex officiis*.
HENRY W. WILSON. JACKSON DAWSON.

For Establishing Prizes.

WILLIAM J. STEWART, of Winchester, Chairman.
CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis*.
MRS. P. D. RICHARDS.

Committee of Arrangements.

JOSEPH H. WOODFORD, of Boston, Chairman.
CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis*.
ROBERT FARQUHAR.

MEMBERS FOR LIFE.

Members of the Society and all other persons who may know of deaths, changes in residence, or other circumstances showing that the following list is incorrect in any particular, will confer a favor by promptly communicating to the Secretary any needed corrections.

Information, or any clew to it, is especially desired in regard to members whose names are marked thus †.

Adams, Luther, Newton.
Alger, Rev. R. F., Becket.
Allen, Hon. Charles H., Lowell.
Ames, Frank M., Canton.
Ames, George, Boston.
Ames, Oakes, 2d, North Easton.
Ames, Preston Adams, Boston.
Amory, Charles, Boston.
Amory, Frederick, Boston.
Andrews, Charles L., Milton.
Andrews, Frank W., Washington, D.C.
Andros, Milton, San Francisco, Cal.
Appleton, Edward, Wakefield.
Appleton, Francis H., Peabody.
Appleton, William S., Boston.
Ash, John, Pomfret Centre, Conn.
Atkins, Edwin F., Belmont.

Bailey, Jason S., West Roxbury.
Bancroft, John C., Boston.
Banfield, Francis L., M.D., Worcester.
Barber, J. Wesley, Newton.
Barnard, James M., Boston.
Barnard, Robert M., Everett.
Barnes, Walter S., Somerville.
† Barney, Levi C., Boston.
Barratt, James, Ballard Vale.
Barrett, Edwin S., Concord.
Barry, John Marshall, Boston.
Barry, William C., Rochester, N.Y.
Bartlett, Edmund, Newburyport.
Beal, Leander, Boston.
Becker, Frederick C., Cambridge.
Beckford, Daniel R., Jr., Jamaica Plain.
Beebe, E. Pierson, Boston.
Beebe, Franklin H., Boston.
Beebe, J. Arthur, Boston.
Berry, James, Brookline.
Blake, Francis, Weston.
Blake, Frederick A., Rochdale.
Blakemore, John E., Roslindale.
Blanchard, John W., Dorchester.
Blinn, Richard D., Chicago, Ill.
Bliss, William, Boston.
Boardman, Samuel M., Hyde Park.
Bôcher, Prof. Ferdinand, Cambridge.
Bockus, Charles E., Dorchester.
Bosler, Frank C., Carlisle, Penn.
Bowditch, Azell C., Somerville.
Bowditch, Charles P., Jamaica Plain.
Bowditch, Ernest W., Milton.
Bowditch, James H., Brookline.
Bowditch, Nathaniel I., Framingham.
Bowditch, William E., Roxbury.
Bowker, William H., Boston.
Brackett, Cephas H., Brighton.
Brackett, Charles N., Watertown.
Bresee, Albert, Hubbardton, Vt.
Brewer, Francis W., Hingham.

Briggs, William S., Lincoln.
Brigham, William T., Honolulu, Hawaii.
Brooks, J. Henry, Milton.
Brown, Alfred S., Jamaica Plain.
Brown, Charles E., Yarmouth, N.S.
Brown, Edward J., Weston.
Brown, George Barnard, Brookline.
Brown, John T., Newburyport.
Bullard, John R., Dedham.
Burlen, William H., Boston.
Burnett, Harry, Southborough.
Burr, Matthew H., Hingham.
Buswell, Frank E., Brooklyn, N.Y.
Butler, Aaron, Wakefield.
Butler, Edward K., Jamaica Plain.

Cabot, Edward C., Brookline.
†Cadness, John, Flushing, N.Y.
Cains, William, South Boston.
Calder, Augustus P., Boston.
Cameron, Robert, Cambridge.
Campbell, Francis, Cambridge.
Capen, John, Boston.
Carlton, Samuel A., Boston.
Carr, Hon. John, Roxbury.
Carter, Charles N., Boston.
Carter, Miss Maria E., Woburn.
Cartwright, George, Dedham.
Chadbourne, Marshall W., Mount Auburn.
Chaffin, John C., Newton.
Chamberlain, Chauncy W., Boston.
Chase, Andrew J., Lynn.
Chase, Daniel E., Somerville.
Chase, George B., Dedham.
Chase, William M., Dorchester.
Cheney, Amos P., Natick.
Cheney, Mrs. Elizabeth S., Wellesley.
Childs, Nathaniel R., Boston.
Choate, Charles F., Southborough.
Christie, William, Newton.
Claflin, Hon. William, Newtonville.
Clapp, Edward B., Dorchester.
Clapp, James H., Dorchester.
Clapp, William C., Dorchester.
Clark, Benjamin C., Boston.
Clark, B. Preston, Cohasset.
Clark, Miss Eleanor J., Pomfret Centre, Conn.
Clark, J. Warren, Rockville.
Clarke, Miss Cora H., Boston.
Cleary, Lawrence, West Roxbury.
Clough, Micajah Pratt, Lynn.
Cobb, Albert A., Brookline.
Cobb, John C., Milton.
Coburn, Isaac E., Everett.
Codman, James M., Brookline.
Codman, Ogden, South Lincoln.
Collamore, Miss Helen, Boston.
Converse, Elisha S., Malden.
Converse, Parker L., Woburn.
Coolidge, Joshua, Mount Auburn.
Cottle, Henry C., Boston.
Cowing, Walter H., West Roxbury.
Cox, Thomas A., Dorchester.
Coy, Samuel I., Boston.
Crawford, Dr. Sarah M., Roxbury.
Crocker, Miss S. H., Boston.
Crosby, George E., West Medford.
†Crowell, Randall H., Chelsea.
Cummings, Hon. John, Woburn.
Curtis, Charles F., Jamaica Plain.
Cushing, Livingston, Weston.
Cushing, Robert M., Boston.

†Daggett, Henry C., Boston.
Dana, Charles B., Wellesley.
Davenport, Albert M., Watertown.
Davenport, Edward, Dorchester.
Davenport, George E., Medford.
Davenport, Henry, New York.
Davis, John, Lowell.
Dawson, Jackson, Jamaica Plain.
Day, William F., Roxbury.
Dee, Thomas W., Mount Auburn.
Denny, Clarence H., Boston.
Denton, Eben, Dorchester.
Dewson, Francis A., Newtonville.
Dexter, F. Gordon, Boston.
Dickerman, George H., Somerville.
Dike, Charles C., Stoneham.
Doliber, Thomas, Brookline.

Donald, William, West Roxbury.
Dorr, George, Dorchester.
Dove, George W. W., Andover.
Dowse, William B. H., West Newton.
Draper, Hon. Eben S., Hopedale.
Dreer, William F., Philadelphia, Pa.
Dumaresq, Herbert, Chestnut Hill.
Dunlap, James H., Nashua, N.H.
Durant, William, Boston.
Durfee, George B., Fall River.
Dutcher, Frank J., Hopedale.

Eaton, Horace, Cambridge.
Edgar, William W., Waverly.
Eldredge, H. Fisher, Boston.
†Eldridge, E. H., Roxbury.
Ellicott, Joseph P., Boston.
Elliot, Mrs. John W., Boston.
Elliott, William H., Brighton.
Endicott, William, Jr., Boston.
Endicott, William E., Canton.
Estabrook, Arthur F., Boston.
Everett, William, Dorchester.
Ewell, Warren, Dorchester.

Fairchild, Charles, Boston.
Falconer, William, Pittsburgh, Pa.
Farlow, Lewis H., Newton.
Farnsworth, Mrs. William, Dedham.
Farquhar, James F. M., Roslindale.
Farquhar, John K. M. L., Roxbury.
Farquhar, Robert, Boston.
Faxon, John, Quincy.
Fewkes, Arthur H., Newton Highlands.
Finlayson, Kenneth, Brookline.
Fisher, James, Roxbury.
Flagg, Augustus, Boston.
Fletcher, George V., Belmont.
Fletcher, J. Henry, Belmont.
Fletcher, John W., Chelsea.
Flint, David B., Boston.
Foster, Francis C., Cambridge.
Fottler, John, Jr., Dorchester.
Fowle, George W., Jamaica Plain.
Fowle, William B., Auburndale.
French, J. D. Williams, Boston.
French, Jonathan, Boston.
French, S. Waldo, Jamaica Plain.
French, W. Clifford, Newton.
Frohock, Roscoe R., Malden.

Galloupe, Charles W., Swampscott.
Galvin, John, Boston.
Gardner, George A., Boston.
Gardner, George P., Boston.
†Gardner, Henry N., Mount Auburn.
Gardner, John L., Brookline.
Gibbs, Wolcott, M.D., Newport, R.I.
Gill, George B., Medford.
Gillard, William, Harrison Square, Dorchester.
Gilmore, E. W., North Easton.
Gilson, F. Howard, Reading.
Glover, Joseph B., Boston.
Goddard, A. Warren, Brookline.
Goddard, Joseph, Sharon.
Goddard, Mrs. Mary T., Newton.
Goodell, L. W., Dwight.
Gorham, James L., Jamaica Plain.
†Gould, Samuel, Boston.
Gowing, Mrs. Clara E., Kendall Green.
Gray, James, Wellesley.
Gregory, Hon. James J. H., Marblehead.
Greig, George, Toronto, Ontario.
Grey, Benjamin, Malden.
Guild, J. Anson, Brookline.

Hadwen, Obadiah B., Worcester.
Hale, James O., Byfield.
Hall, Edwin A., Cambridgeport.
Hall, George A., Chelsea.
Hall, George R., M.D., Warren, R.I.
Hall, Osborn B., Malden.
Hall, William F., Brookline.
Halliday, William H., South Boston.
Hammond, Gardiner G., New London, Conn.
Hammond, George W., Boston.
Hanson, P. G., Woburn.
†Harding, George W., Arlington.
Harding, Louis B., Stamford, Conn.

Hardy, F. D., Cambridgeport.
Harris, Charles, Cambridge.
Harris, Thaddeus William, A.M., Keene, N.H.
Harwood, George Fred, Newton.
Haskell, John C., Lynn.
Hastings, Levi W., Brookline.
Hatch, Mrs. C. S., North Cambridge.
Hatch, Edward, Boston.
Hathaway, Seth W., Marblehead.
Hawken, Mrs. Thomas, Rockland, Me.
†Hazeltine, Hazen, Boston.
Hemenway, Augustus, Canton.
Henshaw, Joseph P. B., Boston.
Hews, Albert H., North Cambridge.
Hilbourn, A. J., Boston.
Hill, John, Stoneham.
Hittinger, Jacob, Mount Auburn.
Hoar, Samuel, Concord.
Hodgkins, John E., Portsmouth, N.H.
Hoitt, Hon. Charles W., Nashua, N.H.
Hollingsworth, Amor L., Milton.
Hollis, George W., Grantville.
Holmes, Edward J., Boston.
Holt, Mrs. Stephen A., Winchester.
Horner, Mrs. Charlotte N. S., Georgetown.
Horsford, Miss Kate, Cambridge.
Hovey, Charles H., South Pasadena, Cal.
Hovey, Stillman S., Woburn.
Howard, Joseph W., Somerville.
Hubbard, Charles T., Weston.
Hubbard, Charles Wells, Weston.
Hubbard, James C., Everett.
Humphrey, George W., Dedham.
Hunnewell, Arthur, Wellesley.
Hunnewell, Henry Sargent, Wellesley.
Hunnewell, H. Hollis, Wellesley.
Hunnewell, Walter, Wellesley.
Hunt, Dudley F., Reading.
Hunt, Francis W., Melrose.
†Hunt, Franklin, Boston.
Hunt, William H., Concord.
Hyde, James F. C., Newton Highlands.

Jack, John George, Jamaica Plain.
Jackson, Charles L., Cambridge.
Jackson, Robert T., Dorchester.
Janvrin, William S., Revere.
Jenks, Charles W., Bedford.
Johnson, J. Frank, Boston.
Jones, Jerome, Brookline.
Jose, Edwin H., Cambridgeport.
Joyce, Mrs. E. S., Medford.

Kakas, Edward, West Medford.
Kellen, William V., Marion.
Kelly, George B., Jamaica Plain.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
†Kendall, Joseph R., San Francisco, Cal.
Kendall, Dr. Walter G., Atlantic.
Kendrick, Mrs. H. P., Allston.
Kennedy, George G., M.D., Roxbury.
Kent, John, Brookline.
†Keyes, E. W., Denver, Col.
Keyes, John M., Concord.
Kidder, Charles A., Southborough.
Kidder, Nathaniel T., Milton.
†Kimball, A. P., Boston.
King, Franklin, Dorchester.
Kingman, Abner A., Brookline.
Kingman, C. D., Middleborough.
Knapp, Walter H., Newtonville.

Lancaster, Charles B., Newton.
Lawrence, Amory A., Boston.
Lawrence, Amos A., Boston.
Lawrence, James, Groton.
Lawrence, John, Groton.
Learned, Charles A., Arlington.
Lee, Charles J., Dorchester.
Lee, Daniel D., Jamaica Plain.
Lee, Francis H., Salem.
Lee, Henry, Boston.
Leeson, Hon. Joseph R., Newton Centre.
Lemme, Frederick, Charlestown.

Leuchars, Robert B., Brookline.
Lewis, William G., Framingham.
Lincoln, George, Hingham.
Lincoln, Col. Solomon, Boston.
Little, James L., Brookline.
Lockwood, Rhodes, Boston.
Lodge, Richard W., Swampscott.
Loftus, John P., Dorchester.
Loomis, Elihu G., Bedford.
Lothrop, William S. H., Boston.
†Lowder, John, Watertown.
Lowell, Augustus, Boston.
Luke, Elijah H., Cambridgeport.
Lumb, William, Boston.
Lunt, William W., Hingham.
Lyman, George H., Wareham.
Lyon, Henry, M.D., Charlestown.

†Mahoney, John, Boston.
Mallet, E. B., Jr., Freeport, Maine.
Mann, James F., Ipswich.
Manning, Jacob W., Reading.
Manning, J. Woodward, Reading.
Manning, Mrs. Lydia B., Reading.
Manning, Robert, Salem.
Manning, Warren H., Brookline.
Marshall, Frederick F., Chelsea.
Mason, Col. Frederick, Taunton.
Matthews, Nathan, Boston.
May, F. W. G., Boston.
McCarty, Timothy, Providence, R.I.
McClure, John, Revere.
McWilliam, George, Whitinsville.
Melvin, James C., West Newton.
Merriam, Herbert, Weston.
Merriam, M. H., Lexington.
Merrill, Hon. Moody, Roxbury.
Metivier, James, Cambridge.
Milmore, Mrs. Joseph, Washington, D.C.
Minton, James, Boston.
Mitton, Edward J., Brookline.
Mixter, George, Boston.
Monteith, David, Dedham.
Montgomery, Alexander, Natick.
Moore, John H., Concord.
Morgan, George H., New York, N.Y.
†Morse, Samuel F., Boston.
Moseley, Charles H., Dorchester.
Mudge, George A., Portsmouth, N.H.
Murphy, William Bowen, Boston.

Nevins, David, Framingham.
Newman, John R., Winchester.
Newton, Rev. William W., Pittsfield.
Nickerson, George A., Dedham.
Norton, Charles W., Allston.
Norton, Edward E., Boston.

Oakman, Hiram A., North Marshfield.
Olmsted, John Charles, Brookline.

Packer, Charles H., Boston.
Paige, Clifton H., Mattapan.
Palmer, Julius A., Jr., Boston.
Parker, Augustus, Roxbury.
Parker, Charles W., Boston.
Partridge, Horace, North Cambridge.
Patten, Marcellus A., Tewksbury.
Paul, Alfred W., Dighton.
Peabody, Francis H., Boston.
Peabody, John E., Boston.
Peck, O. H., Denver, Col.
Peck, William G., Arlington.
Peirce, Silas, Boston.
Perkins, Edward N., Jamaica Plain.
†Perry, George W., Malden.
Philbrick, William D., Newton Centre.
Pierce, Dean, Brookline.
Pierce, George Francis, Dorchester.
Poor, John R., Boston.
Porter, James C., Wollaston.
Potter, Joseph S., Fredericksburg, Va.
Prang, Louis, Roxbury.
Pratt, Laban, Dorchester.
Pratt, Lucius G., West Newton.
Pratt, Robert M., Boston.
Pray, Dr. Mark W., Boston.
Prescott, Eben C., New York.
Pringle, Cyrus G., Charlotte, Vt.

Prouty, Gardner, Littleton.
Putnam, Joshua H., Newton Centre.

Quinby, Hosea M., M.D., Worcester.

Raddin, Everett W., North Cambridge.
Rand, Miss Elizabeth L., Newton Highlands.
Rand, Harry S., North Cambridge.
Rand, Oliver J., Cambridgeport.
Rawson, Warren W., Arlington.
Ray, James F., Franklin.
Ray, Hon. Joseph G., Franklin.
Raymond, Walter, Boston.
Read, Charles A., Manchester.
Reardon, John B., Boston.
Reed, George W., Boston.
Rice, George C., Worcester.
Richards, John J., Boston.
Richardson, Charles E., Cambridge.
Rinn, J. Ph., Boston.
Ripley, Charles, Dorchester.
Ripley, Ebed L., Hingham Centre.
Robbins, I. Gilbert, Melrose Highlands.
Robinson, John, Salem.
Robinson, Joseph B., Dorchester.
Robinson, Warren J., Somerville.
Ross, Henry, Newtonville.
Ross, Waldo O., Boston.
Ruddick, William H., M.D., South Boston.
Russell, George, Woburn.
Russell, Hon. John E., Leicester.
Russell, Walter, Arlington.

Salisbury, William C. G., Boston.
Sanford, Oliver S., Hyde Park.
Sargent, Charles S., Brookline.
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
Scorgie, James C., Cambridge.
†Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, J. Montgomery, Boston.
Shaw, Christopher C., Milford, N.H.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Siebrecht, H. A., New Rochelle, N.Y.
Simpkins, Hon. John, Yarmouthport.
Skinner, Francis, Boston.
Smith, Benjamin G., Cambridge.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Jamaica Plain.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco, Cal.
Smith, George O., Boston.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Souther, Charles H., Jamaica Plain.
Spaulding, Edward, West Newton.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Sprague, Hon. Charles F., Brookline.
Sprague, Isaac, Wellesley Hills.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M.D., Roslindale.
Stewart, William J., Winchester.
Stone, Charles W., Boston.
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Sturgis, Russell, Manchester.
Sturtevant, E. Lewis, M.D., South Framingham.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Taft, John B., Cambridge.
Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G., M.D., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thompson, Leonard, Woburn.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.

Todd, John, Hingham.
Tolman, Benjamin, Concord.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Trepess, Samuel J., Glencove, L.I., N.Y.
†Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Vander-Woerd, Charles, Waltham.
Vinal, Miss Mary L., Somerville.

Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Miss Mary S., Waltham.
Walley, Mrs. W. P., Boston.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Washburn, Andrew, Hyde Park.
Watson, Benjamin M., Jamaica Plain.
Watson, Thomas A., East Braintree.
Watts, Isaac, Waverly.
Webber, Aaron D., Boston.
Webster, Hollis, Cambridge.
Weld, Christopher Minot, Jamaica Plain.
Weld, George W., Newport, R.I.
Weld, Richard H., Boston.
West, Mrs. Maria L., Neponset.
Weston, Seth, Revere.
Wheeler, Frank, Concord.
Wheeler, Wilfred, Concord.
Wheelwright, A. C., Brookline.
Whitcomb, William B., Medford.
White, Francis A., Brookline.
White, Joseph H., Brookline.
Whitney, Arthur E., Winchester.
Whitney, Ellerton P., Milton.
Whittier, Hon. Charles, Roxbury.
Whittier, George E., Groton.
Wilbur, George B., West Newton.
Wilder, Edward Baker, Dorchester.
Wilder, Henry A., Malden.
Willard, E. W., Newport, R.I.
Willcutt, Levi L., West Roxbury.
Williams, Aaron D., Boston.
Williams, Benjamin B., Boston.
Williams, Philander, Taunton.
Willis, George W., Chelsea.
Willis, Joshua C., Roxbury.
Wilson, Col. Henry W., Boston.
Wilson, William Power, Boston.
Winthrop, Robert C., Jr., Boston.
Wood, William K., West Newton.
Woods, Henry, Boston.
Wright, George C., West Acton.
Wright, John G., Brookline.
Wyman, Oliver B., Shrewsbury.

ANNUAL MEMBERS.

Members of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Adams, Henry Saxton, Dorchester.
Allen, Charles L., Floral Park, N.Y.
Alles, William H., Hyde Park.
Anderson, George M., Milton.
Arnold, Mrs. Anna E., Roxbury.
Arnold, Miss Sarah L., Newton Centre.
Atkinson, Edward, Brookline.

Badlam, William H., Dorchester.
Barker, John G., Melrose.
Benedict, Washington G., Boston.
Bigelow, Arthur J., Eastlake, Worcester.
Bigelow, Mrs. Nancy J., Southborough.
Bird, John L., Dorchester.
Blake, Edward D., Boston.
Bliss, Benjamin K., East Bridgewater.
Blomberg, Carl, North Easton.
Bock, William A., North Cambridge.
Bolles, Matthew, Boston.
Bolles, William P., M.D., Roxbury.
Bouvé, Lander M., Brookline.
Boyden, Clarence F., Taunton.
Braman, George H., Newton.
Breck, Charles H., Newton.
Breck, Charles H. B., Brighton.
Brooks, George, Brookline.
Brown, David H., West Medford.
Butler, Edward, Wellesley.

Carpenter, Frank O., West Roxbury.
Carroll, James T., Chelsea.
Carter, Mrs. Sarah D. J., Wilmington.
Cary, Miss Alice B., Lexington.
Chase, Joseph S., Malden.
Chase, Leverett M., Roxbury.
Chase, Philip A., Lynn.
Chubbuck, Isaac Y., Roxbury.
Clapp, Henry L., Roxbury.
Clark, John Spencer, Boston.
Clark, John W., North Hadley.
Clark, Joseph, Manchester.
Clark, Theodore M., Newtonville.
Clarke, Frederick E., Lawrence.
Collins, Frank S., Malden.
Comley, James, Lexington.
Coolidge, David H., Jr., Boston.
Coolidge, Sumner, Mount Auburn.
Cotter, Lawrence, Dorchester.
Cotting, Charles U., Boston.
Councilman, Prof. W. T., Boston.
Crosby, J. Allen, Jamaica Plain.
Curtis, Joseph H., Boston.
Curtis, Louville, Tyngsborough.

Damon, Frederick W., Arlington.
Davis, Frederick, Boston.
Davis, Frederick S., West Roxbury.
Davis, Thomas M., Cambridgeport.
Dawson, Charles Jackson, Jamaica Plain.
Dimick, Orlendo W., Watertown.
Dolbear, Mrs. Alice J., College Hill.
Doran, Enoch E., Brookline.
Dorr, George B., Boston.

Doyle, William E., East Cambridge.
Duffley, Daniel, Brookline.

Eaton, Warren E., Reading.
Endicott, Miss Charlotte M., Canton.
Ewell, Marshall F., Marshfield Hills.

Faxon, Edwin, Jamaica Plain.
Felton, Arthur W., West Newton.
Fenno, Warren, Revere.
Fisher, Sewall, Framingham.
Fitzgerald, Desmond, Brookline.
Fletcher, Fred W., Auburndale.
Forbes, William H., Jamaica Plain.
French, Charles G., Utica, N.Y.
Frost, Artemas, Belmont.
Frost, George, West Newton.
Frost, Varnum, Arlington.
Fuller, T. Otis, Needham.

Gibbon, Mrs. James A., Brookline.
Gill, Mrs. E. M., Medford.
Gilman, Hon. Virgil C., Nashua, N.H.
Grant, Charles E., Concord.
Grew, Henry Sturgis, Boston.
Grey, Thomas J., Chelsea.

Hall, Charles H., M.D., Boston.
Hall, Stacy, Boston.
Hall, William T., Revere.
Hallstram, Charles W., Boston.
Hargraves, William J., Jamaica Plain.
Harris, Frederick L., Wellesley.
Harrison, Thomas, Melrose Highlands.
Hartwell, Samuel, Lincoln.
Hatfield, T. D., Wellesley.
Henshaw, Samuel, West Brighton, N.Y.
Hersey, Alfred H., Hingham.
Hersey, Edmund, Hingham.
Heustis, Warren H., Belmont.
Hewett, Miss Mary C., Canton.
Hill, J. Willard, Belmont.
Hobbs, George M., Boston.
Hollis, George, South Weymouth.
Horton, Herbert A., Brookline.
Houghton, George S., West Newton.
Hubbard, F. Tracey, Cambridge.
Huston, Miss Katherine W., Jamaica Plain.

Ireland, Robert D., Winthrop.

James, Robert Kent, Dorchester.
Jameson, G. W., East Lexington.
Jones, Dr. Mary E., Boston.

Keith, Miss Mary R., Washington, D.C.
Kemp, William S., Brookline.
Kenrick, Miss Anna C., Newton.

Lancaster, Mrs. E. M., Roxbury.
Lawrence, Henry S., Roxbury.
Lee, William W., Northampton.
Lincoln, Miss Agnes W., Medford.
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Lombard, Richard T., Wayland.
Loring, Charles G., Boston.
Loring, John A., North Andover.
Loring, William C., Beverly.
Lothrop, Thornton K., Boston.
Low, Hon. Aaron, Hingham.
Lowell, John, Newton.

Manda, W. A., South Orange, N.J.
Manning, A. Chandler, Reading.
Martin, William J., Milton.
Masten, Cornelius E., Roxbury.
McDowell, Mrs. Mary, Cambridge.
McLaren, Anthony, Westwood.
McMullen, Edgar, Boston.
Meriam, Horatio C., D.M.D., Salem.
Merrill, John J., Roxbury.
Milman, William, Roxbury.
Moody, Abner J., Boston.
Moore, George D., Arlington.
Moseley, Frederick Strong, West Newbury.
Munson, Prof. W. M., Orono, Me.
Mutch, John, Brookline.

Newton, John F., Roxbury.
Nicholson, William, Framingham.

Norton, Michael H., Boston.
Norton, Patrick, Boston.

Olmsted, Frederick Law, Brookline.

Park, William D., Boston.
Park, William P., West Boxford.
Parker, John, Newtonville.
Parker, Walter S., Reading.
Patterson, William, Quincy.
Peirce, George H., Concord Junction.
Petremant, Robert, Brooklyn, N.Y.
Pickman, Dudley L., Boston.
Pigott, Thomas E., Winthrop.
Plimpton, Willard P., West Newton.
Power, Charles J., South Framingham.
Prichard, Joseph V., Boston.
Purdie, George A., Wellesley Hills.

Rea, Charles H., Norwood.
Rea, Frederic J., Norwood.
Rich, Miss Ruth G., Dorchester.
Rich, William E. C., Roxbury.
Rich, William P., Chelsea.
Richards, Mrs. P. D., West Medford.
Robbins, Oliver R., Weston.
Robinson, Walter A., Arlington.
Ross, Charles W., Newtonville.
Ross, Henry Wilson, Newtonville.
Rothwell, James E., Brookline.

Sander, Charles, Brookline.
Saunders, Miss Mary T., Salem.
Sawtelle, J. M., Fitchburg.
Scott, Augustus E., Lexington.
Scudder, Samuel H., Cambridge.
Searles, E. F., Methuen.
Seaver, Edwin P., LL.D., Waban.
Sharples, Stephen P., Cambridge.
Shaw, Hon. Edward P., Newburyport.
Sheppard, Edwin, Lowell.
Smith, Archibald, Somerville.
Southworth, Edward, Quincy.
Squire, Miss Esther A., North Cambridge.
Stearns, Mrs. Charles A., East Watertown.
Stearns, Charles H., Brookline.
Stevens, Mrs. Mary L., Cambridge.
Stevens, Miss Mary O., North Andover.
Stone, Joshua C., Watertown.
Storer, Charles, Providence, R.I.
Story, Miss Sarah W., Brighton.
Swan, Charles W., M.D., Brookline.

Tailby, Joseph, Wellesley.
Teele, William H., West Acton.
Terry, Rev. Calvin, North Weymouth.
Toby, Rufus T., Roxbury.
Travis, Charles B., Brighton.
Tyndale, Theodore H., Brookline.

Vaughan, J. C., Chicago, Ill.

Walsh, Michael H., Wood's Holl.
Warren, Samuel H., Weston.
Welch, Patrick, Dorchester.
Wells, Benjamin T., Newtonville.
Westwood, Thomas H., Jamaica Plain.
Wheeler, Henry A., Newtonville.
Wheeler, James, Brookline.
White, Maurice P., Roxbury.
White, W. Henry, Lowell.
Whitney, Joseph, Cambridgeport.
Whiton, Hon. Starkes, Hingham Centre.
Wilkie, Edward A., Newtonville.
Winter, William C., Mansfield.
Wolcott, Mrs. H. L. T., Dedham.
Wood, Mrs. Anna D., West Newton.
Wood, Elijah A., West Newton.
Wood, E. W., West Newton.
Woodford, Joseph H., Boston.
Woods, Henry F., Boston.
Worthington, Roland, Roxbury.

Young, Arthur W., Hingham.
Young, Charles S., Newton Centre.
Young, E. Bentley, Boston.

Zirngiebel, Denys, Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXII.

Life Members.

The payment of thirty dollars shall constitute a Life Membership and exempt the member from all future assessments, and any Annual Member, having paid all dues, may become a Life Member by the payment of twenty dollars in addition thereto.

Annual Membership.

Every Annual Member, before he receives his diploma or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIII.

Withdrawal or Discontinuance of Membership.

Any member may withdraw from the Society, on giving notice to the Treasurer and paying the amount due from him. Any member who shall neglect for the space of two years to pay his annual assessment, after due notice from the Treasurer, shall cease to be a member. The Treasurer shall give notice of such withdrawals or discontinuances to the Secretary, who shall erase such members' names from the list.

The attention of Annual Members is particularly called to Section XXIII.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Joseph Maxwell, *elected in* 1830, *and* George W. Smith, *elected in* 1851.

Hon. George S. Boutwell, Groton.
H. W. S. Cleveland, Chicago, Ill.
Major L. A. Huguet-Latour, M.P., Montreal, Canada.
Joseph Jefferson, Buzzard's Bay.
Joseph Maxwell, Rio Janeiro, Brazil.
Donald G. Mitchell, New Haven, Conn.
Hon. J. Sterling Morton, Ex-Secretary of Agriculture, Washington, D.C.
Baron R. Von Osten Sacken, Heidelberg, Germany.
Samuel B. Parsons, Flushing, N.Y.
George W. Smith, Boston.
Hon. James Wilson, Secretary of Agriculture, Washington, D.C.

CORRESPONDING MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly reporting to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Alexander Burton, *elected in* 1829, S. Reynolds, M.D., 1832, *and* Francis Summerest (or Summerer), 1833.

Édouard André, Editor in Chief of the Revue Horticole, Paris, France.

Professor L. H. Bailey, Horticultural Department, Cornell University, Ithaca, N.Y.

Charles Baltet, Président de la Société Horticole, Vigneronne, et Forestière de l'Aube, Troyes, France.

Napoleon Baumann, Bolwiller, Alsace.

D. W. Beadle, 303 Crawford St., Toronto, Ontario.

Professor William J. Beal, Agricultural College, Michigan.

Prosper J. Berckmans, Ex-President of the American Pomological Society, Augusta, Ga.

Charles E. Bessey, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.

Dr. Ch. Bolle, Berlin, Prussia.

John Croumbie Brown, LL.D., Haddington, Scotland.

Professor J. L. Budd, Secretary of the Iowa Horticultural Society, Ames.

William Bull, Chelsea, England.

Alexander Burton, United States Consul at Cadiz, Spain, Philadelphia.

Isidor Bush, Bushberg, Jefferson Co., Mo.

George W. Campbell, Ex-President of the Ohio State Horticultural Society, Delaware, O.

Maxime Cornu, Director of the Jardin des Plantes, Paris, France.

Benjamin E. Cotting, M.D., Boston.

Daniel T. Curtis, Dorchester.

Rev. H. Honywood D'Ombrain, Westwell Vicarage, Ashford, Kent, England.

Malcolm Dunn, Dalkeith, Scotland.

W. T. Thiselton Dyer, C.M.G., F.R.S., Director of the Royal Botanic Gardens, Kew, England.

Parker Earle, President of the American Horticultural Society, Roswell, N.M.

GEORGE ELLWANGER, Rochester, N.Y.

HENRY JOHN ELWES, F.L.S., F.Z.S., Colesborn, Andoversford, Gloucestershire, England.

WILLIAM G. FARLOW, M.D., Professor of Cryptogamic Botany, Harvard University, Cambridge.

B. E. FERNOW, Chief of the Division of Forestry, Department of Agriculture, Washington, D.C.

HON. ROBERT W. FURNAS, Ex-President of the Nebraska State Horticultural Society, Brownville.

CHARLES A. GOESSMANN, Ph.D., LL.D., Chemist of the Hatch Experiment Station of the Massachusetts Agricultural College, Amherst.

GEORGE L. GOODALE, M.D., Professor of Botany, Harvard University, Cambridge.

OBADIAH B. HADWEN, President of the Worcester County Horticultural Society, Worcester.

PROFESSOR BYRON D. HALSTED, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N.J.

J. H. HART, Superintendent of the Botanic Garden, Trinidad.

DR. F. M. HEXAMER, Editor American Agriculturist, New York.

J. W. HOFFMANN, Colored State University, Orangeburg, S.C.

J. C. HOLDING, Ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.

The VERY REV. S. REYNOLDS HOLE, D.D., Dean of Rochester, Rochester, England.

SIR JOSEPH HOOKER, K.C.S.I., The Camp, Sunningdale, England.

JOSIAH HOOPES, West Chester, Pa.

GEORGE HUSMANN, Napa, Cal.

WILLIAM J. JOHNSON, M.D., Fort Gaines, Ga.

CHARLES JOLY, Vice-President of the Société Nationale d'Horticulture de France, Paris.

SIR GEORGE KING, Superintendent of the Royal Botanic Garden, Calcutta.

PROFESSOR WILLIAM R. LAZENBY, Secretary of the Agricultural Experiment Station, Columbus, O.

MAX LEICHTLIN, Baden-Baden, Germany.

G. F. B. LEIGHTON, President of the Norfolk Horticultural and Pomological Society, Norfolk, Va.

VICTOR LEMOINE, Nancy, France.

J. LINDEN, Ghent, Belgium.

T. T. LYON, Honorary President of the Michigan Horticultural Society, South Haven.

DR. PETER MACOWAN, F.L.S., Director of the Botanic Garden, Cape Town, Africa.

DR. MAXWELL T. MASTERS, Editor of the Gardeners' Chronicle, London.

GEORGE MAW, Benthal, Kinley, Surrey, England.

T. C. MAXWELL, Geneva, N.Y.

THOMAS MEEHAN, Germantown, Pa.

DR. CHARLES MOHR, Mobile, Ala.

Dr. Daniel Morris, C.M.G., D.Sc., M.A., F.L.S., Assistant Director of the Royal Botanic Gardens, Kew, England.

Ch. Naudin, Antibes, France.

George Nicholson, Curator of the Royal Botanic Gardens, Kew, England.

William Paul, Waltham Cross, London, N.

Professor D. P. Penhallow, Director of the Botanic Garden, Montreal, Canada.

Henry Probasco, Cincinnati, O.

P. T. Quinn, Newark, N.J.

Cavalière Enrico Ragusa, Palermo, Sicily.

D. Redmond, Ocean Springs, Miss.

S. Reynolds, M.D., Schenectady, N.Y.

William Robinson, Editor of The Garden, London.

Edgar Sanders, Chicago, Ill.

William Saunders, Department of Agriculture, Washington, D.C.

William R. Smith, Curator of the Botanic Garden, Washington, D.C.

Robert W. Starr, Port William, N.S.

Dr. Joseph Stayman, Leavenworth, Kan.

Francis Summerest.

William Sumner, Pomaria, S.C.

William Trelease, Director of the Missouri Botanic Garden, St. Louis.

Dr. Melchior Treub, Director of the Botanic Garden, Buitenzorg, Java.

H. J. Veitch, Chelsea, England.

Henry L. de Vilmorin, Secretary of the Société Nationale d'Agriculture de France, Paris.

EXPERIMENT STATION REPORTS WANTED.

The Massachusetts Horticultural Society is endeavoring to collect complete sets of the Bulletins and other publications of all the Agricultural Experiment Stations in the United States and Canada. Those named below are wanting, and any person having a spare copy will confer a favor by addressing the Librarian of the Society, Horticultural Hall, No. 101 Tremont Street, Boston.

Alabama (Ag. and Mech. College Station). — Bulletins 4–6 (1884), 7–10 and 1–4 (1885), 5–9 (1886), and Bulletin 42. 7th Annual Report, for 1894.

Alabama (Canebrake Station). — All Annual Reports later than the 3d, for 1890.

Arizona. — 4th Annual Report, for 1893.

Arkansas. — Bulletin 1. All Annual Reports later than the 4th, for 1891, except the 8th, for 1895.

California. — Bulletins 32, 1878, and 1, 2, 3, 5, and 50, New Series.

Colorado. — Bulletin 3.

Connecticut (New Haven Station). — Bulletins 1 to 67, inclusive. Annual Reports for 1877 to 1883, inclusive, except that for 1878.

Indiana (Purdue Univ. School of Ag.). — Bulletin 1. College Reports 1 to 14, inclusive.

Kentucky. — Bulletin 10.

Michigan. — 6th Annual Report, for 1892–93. (Contained in Report of Michigan Board of Agriculture, 1893.)

Missouri. — Bulletins 9, 13, 15, 16, 19, 20, 25, 26, and 33 of Old Series. All Annual Reports since the 1st, for 1888.

New Jersey. — Bulletins 1, 4, 5, 15, 27, and 28.

New York (Cornell). — Annual Report, 1882–83 (Report of Agricultural Department of Cornell University).

North Carolina. — Bulletins 1 to 56, inclusive, and 69, 2d ed. Meteorological Division, Bulletin 2 (68*b*), and 2d and 3d Annual Reports, for 1888 and 1889. Special Bulletins 1 (77*a*) and 4 (82*a*). Weekly Weather Crop Bulletins 1–21, 1888; 1–24, 1889; 1–25, 1890; 2 and 4, 1891.

North Dakota. — 4th Annual Report, for 1893.

Ohio. — All Bulletins of First Series, except 16, 17, 18, and 19.

Oklahoma. — Bulletins 26 to 29, inclusive.

Pennsylvania. — Annual Reports for 1869, 1872, 1879–80, 1881, 1882, 1883, and 1884. [All issued by the State College.] Annual Report for 1895. Bulletin of Information No. 1.

South Carolina. — All Bulletins of the Old Series (previous to 1888) on the work of the Experimental Farm of the South Carolina College. 3d Annual Report, for 1890, and 6th, for 1893.

Texas. — College Bulletins 1–5, 1883–1887.

West Virginia. — Special Bulletin — Potash and Paying Crops, 1890. All Annual Reports later than the 3d, for 1890.

Wyoming. — Bulletins 1 to 4, 9, and 10.

Ontario Department of Agriculture, Toronto. — Bureau of Industries. — Agricultural Returns to the Ontario Bureau of Industries, Nov. 1882 (5th), Aug. 1883 (7th), and Nov. 1887 (20th).

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1898.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1899.

☞ SEE LAST PAGE OF COVER.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1898.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1899.

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The following lectures have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the "Boston Evening Transcript." As here presented, the lectures are printed in full, and reports of the discussions following the lectures are added, these, where it appeared necessary, having been carefully revised by the speakers.

The Committee on Lectures and Publication take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature, in the lectures and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

B. M. Watson,
J. H. Bowditch,
Aaron Low,
Committee on Lectures and Publication.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 1, 1898.

A duly notified stated meeting of the Society was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

In the absence of the Secretary, by reason of illness, the President appointed Miss C. M. Endicott Secretary *pro tem.*

The following appropriations, recommended by the Executive Committee at the meeting on the sixth of November, came up for final action, and were unanimously voted, viz.:

For Prizes and Gratuities:	
For Plants for the year 1898	$2,000
For Fruits " "	1,732
For Flowers " "	2,668
For Vegetables " "	1,200
For Gardens, etc. " "	500
Total	$8,100

The President, as Chairman of the Executive Committee, reported a recommendation that the Society make the following further appropriations for the year 1898:

For the Committee on Lectures and Publication, this sum to include the income of $50 from the John Lewis Russell Fund	$300
For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee	400

For the Committee on the Library, for the purchase of magazines and newspapers, binding of books, and incidental expenses of said Committee . . . $400

For the Committee on School Gardens and Children's Herbariums, this sum to cover all incidental expenses of the Committee, and to be paid through the usual channels 250

For the salaries of the Secretary and Librarian and the Treasurer and Superintendent of the Building . . 3,000

These appropriations were unanimously voted.

The President reported the appointment by the Executive Committee of Charles E. Richardson as Treasurer and Superintendent of the Building, and Robert Manning as Secretary and Librarian, for the year 1898.

Professor Benjamin M. Watson, Chairman of the Committee on Lectures and Publication, announced that the Programme of Lectures for the season of 1898 had been printed and distributed to members, and expressed the gratitude of the Committee to the retiring Chairman, Mr. J. D. W. French, who had served so long on that Committee, for his assistance in preparing the present course of lectures.

E. W. Wood, Delegate to the State Board of Agriculture, presented his Annual Report, which was referred, without reading, to the Committee on Publication.

The Annual Report of Henry L. Clapp, Chairman of the Committee on School Gardens and Children's Herbariums, was also referred in like manner.

President Appleton announced that he had decided to defer the delivery of the usual Annual Address of the President to a later meeting, as there were important matters now under consideration which he wished to mention in it.

The President called attention to the Schedule of Prizes for 1898, and also announced that the first of the course of lectures before the Society would be given on the following Saturday.

HENRY T. CLINKABERRY, of Trenton, N.J.,

having been recommended by the Executive Committee for membership in the Society, was on ballot duly elected.

On recommendation of the same Committee

PETER NØVIK, Secretary of the Norwegian Horticultural Society, Christiania, and

BENJAMIN LINCOLN ROBINSON, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge, were elected Corresponding Members of the Society.

Adjourned to Saturday, February 5.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 8, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture was delivered:

THE BUSINESS SIDE OF FRUIT CULTURE.

By J. H. HALE, South Glastonbury, Conn.

Members of the Massachusetts Horticultural Society: I shall speak to you today on the Business Side of Fruit Culture. This is an important side in this country, and one which is growing in importance. This growth is hardly realized by one who is not in close touch with the subject. One branch in particular in which this growth is marked, and one which I have had especial opportunity of studying, is that of nurseries. Up to 1890 there had been, in this country, no investigations on this subject. In the Census of 1890 this question received special attention, and I was appointed by the Superintendent of the Census to take charge of and report on this branch of horticulture. I found during my investigations, which covered the whole country, that while, previous to 1800, there had been but few commercial nurseries in the country, there were, in 1890, nearly five thousand. Statistics showed that these nurseries contained the enormous numbers of 240,000,000 apple, 38,000,000 cherry, 49,000,000 peach, 38,000,000 plum, and other trees, as well as 271,000,000 strawberry plants, 86,000,000 raspberries, 49,000,000 currants, etc. These represent, however, a two years' supply. I was astonished at the great numbers, and it seemed as if the country would be overstocked. But when one comes to consider that carelessness in the nursery,

in transporting, and in receiving and planting, result in the loss of fifty per cent, and that more than fifty per cent of the remainder is lost by the poor treatment received by the trees after they are transplanted, leaving only twenty-five per cent which survive three years after leaving the nursery, and that only a small percentage of the remainder comes to perfect fruitage, it is apparent that the danger of overproduction is not so great after all. With commercial planters, on the contrary, nearly ninety per cent of the trees bought are made to grow; so that the man who has a *business* interest loses but ten per cent.

Among semi-tropical fruits we find that the growing of oranges, especially in California, has greatly increased — hardly 1,000,000 boxes in 1890, while the present season's crop promises 7,000,000 boxes at $2.00 or more per box in the orchard, and young trees already planted will soon increase this yield to ten or twelve million boxes. This is practically a new field of orchard work, and though orange growing is not of special interest to us in New England, every pomologist should feel an interest in all departments of fruit growing in his own country. Every commercial fruit grower should keep in touch with the details of all such matters. He must also keep in touch with the market, know what the demand is for, and know what prices the different fruits bring, and why it is so. Unless he does this he will not get his full reward. He must give no less attention to growing, and more to keeping abreast of the times.

Another field of study for the commercial fruit grower is that of soil. Special soils are needed for special varieties of fruits, and a man must study closely the soil conditions and the adaptability of varieties to the various soils. He must also watch his neighbors and see what they are doing, and learn from the mistakes of others as well as from their successes.

But the greatest thing for him to study is himself. Does he *enjoy* the plants? Does he enjoy working and planning for them? To attempt to go into commercial fruit growing just to make money is worse than useless. A man does that best which he most enjoys. Whatever you do you want to get pleasure out of. So do not enter commercial fruit growing unless you have a love for it, and so are better able to attain the higher possibilities of fruit culture. And one must not be discouraged by the various failures or misfortunes that may come to him in

his work. A man who will become easily discouraged by a frost, a drought, insects, or fungus pests is not likely to succeed.

Just what fruits one should plant depends to a great extent upon the farm itself, upon what the man enjoys, and to a degree upon the markets which he aims to supply.

The new race of Japanese plums are fruits to which a good deal of attention has recently been given. They are early and abundant bearers, and have the advantage over European plums of being better adapted to our soils, and cover a very wide range of season — from early June till October. Many of them are of high quality, and will keep in good condition from one to two weeks after being picked ripe from the tree.

Of our older fruits the apple is the surest and best. It is easy to grow and will nearly take care of itself; still that is not the best way to grow it. We have lately heard a great deal about "abandoned farms." Many of them may not be adapted to growing the finer crops, but it seems to me that many of them offer a fine opportunity for growing apples. When we consider how well the apple tree does without much culture, and when we note the ever increasing demand of the world for apples of fine appearance and high quality, it seems as if it would be a good thing to devote some of the abandoned farms to high grade apple orchards. People will generally say that there is not much profit in planting apple trees on these hilly farms in New England, but in my opinion the man who will plant a hundred or a thousand trees on such a farm, and will give them thorough culture, feeding, spraying, and pruning, and will pay careful attention to thinning the fruit, will get winter apples of fine appearance and good quality, — too many have fine appearance and *poor* quality, — and find a ready market for them, always at a price that will pay a profit. But in future years high quality must also go with fine appearance.

The talk of an "off year" is generally because the orchard is in the hands of an off man. When apple trees bear very heavily they exhaust the vitality of the tree, and the buds for the following year get insufficient nourishment, or possibly none are developed, and the next year a very small crop, or more likely no crop, is the result. The remedy for this is in thinning the fruit on the trees annually from their earliest bearing. This ensures annual fruitage except occasionally when the crop is lost through

climatic conditions. I will make the prediction that the man who will invest capital in planting winter apples, keeping them in good condition according to the best modern methods, and carefully thinning the crops, will receive three or four times the annual dividend that the average of manufacturing enterprise in Massachusetts will pay. Right apple culture is sure to pay better than manufacturing, and for many years to come there will be less competition between apple culturists than between manufacturers.

In cultivating the peach the climatic conditions are such that the fruit grower has to be very alert to prevent damage to his fruit buds in Massachusetts. East of the Connecticut river peaches may be grown well on many acres of high, dry lands by carefully studying the conditions, by feeding well, and by giving good frost drainage. It is best to plant on an abrupt knoll, so that frost will run off quickly. By selection of land affording the above conditions peaches may be grown with success. They may be grown profitably too, for there is a great demand for good home grown peaches ripened on the tree, as is evinced by the carloads brought here from other localities and sold at good prices, though far inferior to those that may be grown here.

We will next consider small fruits. The markets give liberal returns for fruit of the highest grade. We shall find, however, that most of the *fine* canned fruit put up in glass for the best market is that brought from across the water, and I wonder that we Yankees have not awakened to the possibility of taking this market for our own. Certainly our boys and girls can do as well as the peasants of Europe.

There is another fruit (if such it may be called) which is very interesting to me, and that is the chestnut. In southern New England the trees in field and forest grow luxuriantly and bear full crops, though the nuts are small. When the right time comes the boys and girls rush out and gather the nuts and carry them off to market. How greedy the markets are for them! The whole supply is gone in six weeks, though the people would eat them all winter. We import large quantities of foreign chestnuts, but if we could get enough native chestnuts of a large size, with the fine quality of our nuts, we could displace the foreign supply with our own product. Still better results could be obtained by grafting our chestnut sprout lands with large, sweet

Japanese varieties. Money invested in growing chestnuts for market in this way would pay large rewards, for native sprouts grafted with the early bearing Japanese varieties will furnish paying crops in six or eight years, and this would certainly be a promising industry for the people of New England, wherever the native chestnut grows freely.

The whole theory of successful soil culture consists in selling water, because it is the cheapest gift to man. The grain farmer cuts great chunks off the plant food in the soil and sends it away. So does the potato grower, the market gardener, the hay farmer, and, to a less extent, the dairyman. The fruit grower keeps most of his plant food at home and sells water just as truly as though he tapped the spring and piped its water down into the market, only the fruit baskets take the place of pipes.

Fruit culture is one thing that enables us to sell watered stock and satisfy our customers. Disguised in the luscious strawberry, blooming raspberry, ebony blackberry, or beneath the rosy skin of some one of our delicious tree fruits, water finds a ready market at prices that leave "millions in it" for the one who most skilfully assists Nature in "turning water into wine" (fruits). Every season occurs the apparent miracle of turning water, often impure and unwholesome, into rich and healthful fruits, which are "absolutely pure," and free from germs or microbes.

How best and most economically to assist Nature in the work, and reap the greatest rewards, is the question. How shall the watercourses be turned into the channels of tree, plant, and vine, and help to turn the wheels of fruit culture in such a way as to give the best final results?

A deep ploughing and a thorough pulverization of the soil will make it capable of holding much more water than before. A cubic foot of soil will hold, after being pulverized, a hundred times as much water as that soil would hold before. This water will be taken up by the roots of your fruit trees and so will swell up your fruit. If you cannot keep enough moisture in the soil by pulverizing you will have to try to do it by mulching, and if you cannot by mulching then by irrigation, but let me say that you cannot irrigate a large tract with windmills and tanks.

Just at present a bushel of apples, wheat, or potatoes sells for about the same price, $1 for 60 pounds. In the apples we sell 1 ounce nitrogen, 1¼ ounces potash, and ½ ounce phosphoric acid,

which costs 1½ cents, leaving 98½ cents for the water. Potatoes take from the farm 4 ounces nitrogen, 2 ounces phosphoric acid, and nearly 5 ounces potash, valued at 6¼ cents, leaving 93¾ cents for the water. The bushel of wheat has 1½ pounds nitrogen, 10 ounces phosphoric acid, and 5 of potash, worth 30¼ cents, leaving only 69¾ cents for the water. Fifteen bushels of apples take no more plant food from the soil than one bushel of wheat, yet bottled up under their bright skin you can sell 765 pounds of water for $14.77! To sell the same amount of water in wheat would take 84 bushels, or the product of five average acres, while the apples would come from one well grown and well nurtured tree. Eighteen pounds water, ¼ ounce nitrogen, ⅛ ounce potash, and so little phosphoric acid that you cannot see it with a microscope, all costing less than ½ a cent, make 10 quarts of strawberries, that sell for $1, the same as the bushel of wheat, which takes sixty times as much plant food from the soil. Selling water in a strawberry basket enriches both the farm and the farmer.

My trial bed and test plot of strawberries is on medium sandy loam soil, well pulverized to the depth of 15 inches, then subirrigated by ¾-inch perforated iron pipes, lying 6 feet apart, 1 foot below the surface. Every condition is as favorable as I know how to make it for pumping water into strawberries, and so securing the greatest size and yield. It contains 12 plants each of all leading varieties. Each plant is allowed 2¼ square feet of land. Six of the largest and most productive varieties yielded an average of a little more than one quart to the plant, 18,360 quarts per acre. The average for the whole bed, including many shy fruiting varieties, was ⅝ of a quart per plant, or 13,115 quarts per acre, 400 per cent increase over 3,200 quarts, the average yield in the State. These berries were so puffed up in size and beauty by extra conditions that their selling price was 50 per cent above average market prices.

If with water you can float 400 per cent increased yield into market and soak the price up 50 per cent more, does that not show profit enough to keep all soil pumps well oiled and leave a good margin for outside fun? Three hundred and forty of my big Japan plums, 82 per cent water and 18 parts solid, made a bushel that sold at $4.80, while 720 of same varieties 26 parts solid and only 74 of water, made a bushel that sold the same day in the

same market at $2.56, or over $100 per barrel for the extra percentage of water in the larger plums. Open up the water-courses of the soil, and be ready for the flood tide of prosperity; it is of no use to dam it with "I can't!"

My big peaches — 100 to the bushel — 92 parts water to 8 parts solids, sold at $5; the same variety, 400 to the bushel, were 84 parts water, 16 of solids, and sold at 70 cents per bushel — $4.60 for the water and 40 cents for the solids in the large fruit, and 58.7 cents for the water and 11.3 cents for the solids in the small ones, or $5.64 per gallon for *extra* water.

Next to thorough soil culture is a matter which I think is of great importance, and that is cultivating the plants late into the fall. For the more thoroughly we can cultivate the plants late in the season the better will the fruit buds winter. If we cease culture early, wood and fruit buds mature early, so that the leaves fall off too soon, the warm weather of late fall will sometimes start the buds of next year to swelling, and then when the severe winter weather comes the buds are winter-killed. There is, however, even danger of cultivating *too* late. Yet for all this it is often the late growth of a plant that stands the winter best, and you can notice, among tender blackberries and raspberries, where a plant was exposed, that the little late suckers withstood the cold while the early matured canes were often winter-killed.

To keep foliage in good condition we must occasionally spray the plants. The finest fruit comes only from trees and plants that have healthy foliage. Then there is another important fact. I have seen apple and pear orchards which have failed to fruit because of too much foliage and soft wood growth. This fault can be corrected by witholding stable and other nitrogenous manures and by root pruning of over vigorous trees, which treatment will cause them to form fruit buds and become productive.

The next subject to consider is that of cover crops. The land in orchards should not be left bare through the freezing of late fall and early spring. After fertilizing, leaving the ground bare is wasteful, and a cover crop should be sown wherever possible, not only to prevent the waste of fertility, but also as a protection to the tree roots. These cover crops should be of such plants as will gather in the free nitrogen of the air, so that when they are ploughed under, the soil will be enriched. In Connecticut I find clover to be one of the best crops to plant. In Western New

York and Michigan they use various kinds of vetches. The cover crop should be sown in August or early September, and should be ploughed in in the spring. It should be done early in the spring — not left till May or June. This treatment will many times repay the planter. As I said, it should be ploughed in early in the spring, and I should especially state that this means *shallow* ploughing. Deep ploughing is apt to be pretty dangerous. This cover crop is very good for green manuring. After ploughing in in the springtime, a summer green crop may be sown if it is desirable to enrich the land at small cost, and I find that the Southern cow pea does very well. Early in June I should plant two or three rows of cow peas in drills between each two rows of young orchard trees. Then culture can be continued.

All purchased fertilizers cost a good deal, and yet commercial fruit growers need buy scarcely a dollar's worth of high priced nitrogen. Mother Nature will give him a very good fertilizer if he uses these cover crops, and he need never buy nitrogen. Of other kinds of fertilizers phosphoric acid and potash are most needed, but in all this question of fertilizers the local soil conditions have to be studied, and plans made with regard to them. But one thing must be remembered, and that is that stable manure must be avoided in most orchards after they come of fruiting age.

We now come to the subject of diseases and insects which injure the health of fruits. The injurious insect of which we hear a great deal of late is the San José scale. There is, however, one very good thing about the San José scale. It has scared the fruit growers. Men are now looking over and examining their fruit trees as they never did before, and they examine critically every tree they buy, and as a result their orchards are likely to be much better known and cared for than ever before. So the San José scale, a dangerous pest as it is, has proved a great blessing. And the San José scale is the one thing that will kill an apple tree. So apple trees that have rather been left to themselves in the past must now be carefully looked after or go down. This of course means better apple culture and better apples.

Then there is the disease of yellows, which attacks peach trees, and spreads easily from tree to tree, and if left will kill the trees. In eradicating this disease the most vigorous measures must be taken. Every infested tree must be taken up and

burned, root and top. A man who pulls up and burns a tree infested by yellows does good missionary work. I take such a tree out the first day I see it. I recently sold a lot of peaches here in Boston market, and near me was a man selling two loads of peaches which were full of yellows. He got 25 cents a basket for his peaches, while I got $1.35 for mine. I was ahead $1.10 on every basket, because I was "scared" of yellows. The man who is scared is bound to make money. He is alert to the danger that threatens his business, and so uses every known means to check loss.

Then another disease is the rust of the strawberry, or the red rust, as it is called. On some soils and with some varieties, this does not spread, but on others it does, and the treatment to give the plants is to dip them, when setting out, into a solution of Bordeaux mixture, then to spray once or twice during the summer with the mixture, and again once or twice early in the following spring. It may cost $15 per acre through the season to spray; it will pay, however, and pay handsomely.

We will next consider the thinning of fruit. I wonder how many of you practise the thinning of fruit on your apple trees. Now, apple trees will do a good deal if you do nothing for them. But the man who wants good apples — apples that will pay — in the future will practise thinning his fruit. I should take a young tree which attempted to produce one hundred apples, and remove at least fifty of them, leaving not more than fifty to ripen. The next year, if it attempted to produce two hundred, I should leave one hundred or less, and the next, if it had one thousand apples, I should leave three or four hundred only. By this method I should get that tree into the habit of annual bearing. The man who will make fruit growing a profitable business will thin all his fruit. A peach tree that will set one thousand peaches needs to have six or seven hundred thinned off. The commercial side of fruit growing demands thinning of nearly all your fruits. You will get more bushels to the tree within reasonable bounds; the more you throw away the more pounds or bushels you will have left, increased size more than making up loss in number. In thinning Japanese plums I should leave the fruits four inches apart, and peaches from five to six inches. If you make a practice of thinning your fruit from the trees, you will usually get four dollars for one. I have often had it in-

crease the crop fifty per cent, and the selling prices five hundred per cent.

The next thing after producing fine fruit is to know how to sell it so that it will bring the most money. Great care needs to be given to the picking of fruit, and careful attention to the marketing. You want to go into the market and study the sales of fruit. You will find that that which brings the best price is that which is the neatest, the fullest, and the most honestly packed for local markets. You want to leave the small fruits until thoroughly ripe, and then pick in the cool of the day. The fruit should be packed always in a cool place and put in tight packages, for the less the air reaches the fruit the better it will keep. Then the crates and boxes should be kept away from the air as much as possible. In packing you want to grade your fruit. The finest will go for fancy, then number one and seconds. All, however, should be good, sound fruit, of as even size and quality as possible. The three or four grades should be uniform throughout. Ask your dealers what kind of packages sell best. Then get the neatest and most attractive packages you can, and have the fruit put up as neatly as possible. It should be graded by hand. In many fruit districts they have a method of grading tree fruits by machinery, and it appears at first sight to do no harm to the fruit. But in a few hours the fruit will lose color by this method of grading. Then you want to pack honestly, from top to bottom, and just as full as possible. But I would not get men to do the packing. Hire girls for this part of the work, and you will find that the work is better done. Next label your brand and then strike upon a good dealer. Tell him it is a good thing, for you know that it is, and make him know it too. Have a good commission man, and, if possible, make him come out to your place and see your orchards, and study your methods of doing the work. Have him *believe* in your fruit.

The business side of fruit growing means belief in yourself, and then getting those with whom you trade to believe in you.

Finally, believe in your line of business. Don't get into it until you have carefully thought it out and made up your mind that you can succeed in it, and then stick to it all the time, on the alert at all times for most approved methods and varieties.

DISCUSSION.

A gentleman asked what treatment was best for the black knot.

Mr. Hale replied that it should be cut out thoroughly as soon as it appears. Then the trees should be sprayed with Bordeaux mixture. This disease is now known to be controllable.

C. S. Pratt asked how to cool off berries before packing them.

Mr. Hale replied that if they must be picked in the heat of the day he would pack in ventilating crates and then haul the crates to a cool place.

Samuel H. Warren inquired whether it was better to pack apples in barrels or in crates.

Mr. Hale replied that he should use whatever kind the market demanded. He believes, however, that the time is coming when barrels will be abandoned for crates or boxes. The former, being easy to roll, make injury to the apples greater than would be the case with boxes.

Mr. Warren said he wished to ask about spraying strawberry plants for rust. The Experiment Station at Amherst had not been successful in this treatment, and he should like to know what the reason was.

Mr. Hale said that as he did not know the conditions he could not say; but on his farm the Downing and Marshall strawberries, which rust as quickly as any varieties, are kept wholly free from rust by the use of Bordeaux mixture. He would spray at least once in the fall and twice in the spring before fruiting.

Mr. Warren wished to know whether Mr. Hale had left any plants unsprayed, so that he could tell whether the plants on his farm would have been affected by rust at all.

Mr. Hale said he had left some and they were attacked by the rust.

A lady asked what varieties of strawberries the lecturer would recommend, and whether he thought hill culture or matted rows the most profitable way of growing plants.

Mr. Hale replied that as to variety it would depend largely upon the soil. As to the most profitable way of growing he would say hill culture by all means. People sometimes prefer matted rows, but chiefly because that is the easier way.

Benjamin W. Putnam remarked that the lecturer had said that rust reduced the yield of the strawberry plants very much, but

that he knew a strawberry grower who said the rust did not harm the plants; he should like to know how much Mr. Hale thought rust hurt the plants.

Mr. Hale replied that he had known the yield to be cut down seventy-five per cent by rust.

Mr. Frost wanted to know whether the lecturer meant to say that hill culture would be better than matted rows.

Mr. Hale said he certainly did.

Mr. Frost said that the hill system had been tried here long ago and cultivators had returned to the matted row system. He thought that the best fruit came from matted rows, while in the hill system one-third of the hills would be found dead.

Mr. Warren said that Mr. Frost practically cultivated in the hill system.

Thomas Harrison said that he did not, himself, find the rust very troublesome, and wished to know why he had not.

Mr. Hale said that rust spreads according to the weather conditions. Warm, damp, cloudy weather made it spread, while the opposite conditions would not favor its increase.

Robert Farquhar wished to know what remedy Mr. Hale would recommend for the San José scale.

Mr. Hale replied that whale oil soap was by all means the best remedy. However, he had had very little trouble with this pest.

Professor W. M. Munson said that he thought the reason Mr. Hale had not had trouble with the San José scale was because he had been using Bordeaux mixture.

Mr. Harrison said he had found this pest some time ago on vines of the Concord grape. He thought it might have been brought on some California grape vines. He had, however, pulled up and burned the vines, and had never seen the scale since. Mr. Harrison also said he should like to ask whether Mr. Hale had taken into consideration the cultivation of the red currant.

Mr. Hale replied that the market for red currants had been largely overstocked the past ten years.

In answer to further questions Mr. Hale said that natural apple trees are best to graft on. In treating apple trees he would trust to chemical manures, and would mulch if there was danger of drought. Apple trees, if well cared for, would not need to be scraped, but in case of a person buying an old orchard which was in poor condition he would advise scraping the trees and then

spraying twice with copper sulphate. It would be best to head trees rather low, as the more work that can be done from the ground the better. It is better to grow trees with one leader, for two or three leaders tend to break down a tree.

Arthur M. Clement expressed himself as being in favor of a peach yellows law, and wished to ask Mr. Hale why the peach yellows law in Connecticut was repealed.

Mr. Hale replied that a combination of circumstances had caused the repeal of this law. For one thing, many of those who were against it were opposed to progress in agricultural matters generally. The law had worked admirably for five years. Some private growers who had only one or two trees which bore well, though affected by the yellows, felt it unfair that their trees should be destroyed, not seeing how this would benefit the community, but only how it affected themselves at the time; they would rather have poor fruit than none. All the commercial fruit growers wholly favored the law. He thought the law would be reënacted the next year, as it had been repealed by combinations of votes of four or five factions. Not one single progressive horticulturist in Connecticut wanted its repeal.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 15, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture, illustrated by many stereopticon views, was given:

HORTICULTURE IN HOLLAND: DECORATION IN PUBLIC PARKS, BULB GROWING, NURSERY STOCK AT BOSKOOP.

By JOHN K. M. L. FARQUHAR, Boston.

Holland presents to the horticulturist many interesting features peculiarly her own.

Her wet soil and moist atmosphere have rendered her unable to enter many avenues of horticultural industry open to Germany and France, but of the few available to her she has not failed to make the most.

For two hundred years she has supplied the nations of northern latitudes with bulbs from which to raise flowers to gladden their conservatories in winter, and their gardens in spring, and she has established a constantly increasing business, the monopoly of which seems assured to her for ages to come. Her exports of bulbs and nursery stock now aggregate five million dollars annually.

Such elaborate flower stores as we have in Boston are not to be found in Holland, for as we pass through Rotterdam we see a flower market where a few men and women do the business, the flowers being chiefly of the more ordinary kinds — bunches of candytuft, stocks, sweet williams, mignonette, and outdoor roses. The flowers are brought here in the morning, sold at low prices, and by noon the business is over. Amsterdam has a similar market.

Dutch horticulturists devote most of their energy to supplying the wants of other nations, their home trade, especially in cut flowers, being exceedingly small. Many of the residential streets, however, have a strip of grass with shade trees and tastefully planted flower beds on one or both sides of the canals which occupy the centre. Even in the narrow business streets of Rotterdam we find valuable space devoted to trees — more, I think, than our citizens would be willing to allot under similar conditions.

The Dier Gaarde (which is a botanical and zoölogical garden combined) presents many features of interest. It is really an improved marsh, with the inevitable canals widened here and there into ponds, the excavated material adding to the land area. The surface being perfectly flat, the landscape gardener has had to depend largely on the grouping of trees and shrubs for variety of scenery.

The shrubbery is extensive and select. In addition to such shrubs as we see in our gardens, we find the yew, the bay, *Aucuba Japonica*, *Araucaria imbricata*, golden thuja, green and variegated hollies, and many other choice species not hardy in New England.

There are magnificent groups of Japanese maples, and roses grown in standard form — that is, grafted on stems three or four feet high; also fine collections of irises, pæonies, and other hardy plants.

There is a large curvilinear iron-framed conservatory which contains a creditable collection of palms, cycads, and other trop-

ical plants. Also an aquatic house in which was a fine plant of the great annual South American water lily, *Victoria regia*, in bloom.

In Holland we find no such gigantic greenhouses as may be seen on the larger estates in England, like Chatsworth or Sion House; hardy trees, shrubs, vines, and herbaceous plants being more generally depended on for landscape decoration. This policy we find successfully exemplified in Boston's new parks.

The Dier Gaarde is, however, a *garden*, and here we find a number of tastefully arranged flower beds. Visiting this place, several years ago, I found more than half of these beds planted with geraniums. Now we find that the geraniums have given place to tuberous and fibrous rooted bedding begonias. Holland has only been keeping in line with other nations in making this change. In England, France, Germany, and even in our own Newport, we now find begonias the most popular class of bedding plants. They are used most extensively, perhaps, in Paris.

The dwarf forms of *Begonia semperflorens* are largely employed, and these have been found to do well in this country, especially the varieties Vernon and Erfordia.

In France the varieties of *Begonia fuchsioides* and *B. Wiltoniensis* and the dwarf, compact, tuberous sorts are in favor. In the Parc Monceau, in Paris, I beheld a bed of nine thousand plants of the last mentioned, with small, double, Jacqueminot-rose-color blossoms, which was truly gorgeous.

I do not wish, however, to convey the impression that geraniums have been wholly discarded as bedding plants; they will always be used to some extent.

I will not trespass upon your time to speak further on bedding plants except to say that set figures are giving place to simple mixed beds. For example, a bed composed of *Calceolaria rugosa* (yellow), purple heliotrope, and *Centaurea candidissima*, set promiscuously with a border of achyranthes, was one of the most pleasing.

One of the pleasantest parks in Holland is the Wood-land, surrounding the summer palace at The Hague. The Wood covers an area of four square miles, and is intersected by magnificent avenues. Situated as it is near the most modern and fashionable city of the country, and convenient to Skevening, where tourists

and invalids resort from all parts of Europe for its famous wind baths, the Wood is much frequented.

About the palace (where John Lothrop Motley, of Boston, spent many an hour as the guest of the queen while resident at The Hague gathering material for his famous history, "The Rise of the Dutch Republic") there is little floral decoration, and it can well be dispensed with, for the rustic beauty of this sylvan scene would not be improved by it.

In Haarlem there is a similar wood which has been used as a place of public recreation for more than five centuries. In this wood, in 1420, Laurens Koster is said to have discovered the art of printing, while cutting figures on pieces of stick and making impressions with them for the amusement of his children. Among the trees we find oak, elm, beech, birch, linden, maple, ash, and horse-chestnut.

Haarlem is the largest city of North Holland, and the trade centre of the bulb growing district. In the suburbs we find many luxurious residences, with ample grounds, many of them the homes of wealthy bulb growers.

We proceed by steam train from Haarlem, by way of Vogelenzang, where we pass through extensive bulb fields, towards the Lake of Haarlem. There is, however, no Lake of Haarlem now; only a great canal, 38 miles in length, from 115 to 130 feet wide, and 14 feet deep, in which ships sail and steamers ply, surrounding 70 square miles of low land that fifty years ago was a lake. This region is of interest to us, because along the western portion of the canal we find the finest hyacinth ground in Holland.

In 1837 the king appointed a commission to consider the best means of draining the lake — partly on account of the known richness of its bed, but chiefly because of the danger of inundation to which the cities of Leyden and Amsterdam were exposed by the rising of its waters during hurricanes.

The commission found the project practicable, and the great canal was built for the double purpose of conveying the water to the sea and to accommodate the shipping, which had been heavy on the lake.

The water was pumped from the lake into the canal by three engines, each capable of raising one hundred and twelve tons of water at a stroke, or a million tons in twenty-five and a half hours, and it took these three monsters four years to pump the

lake dry. The vastness of the undertaking will be better understood, perhaps, when I tell you that the area of this former lake now supports a population of ten thousand.

The soil is of various kinds — peat, clay, and sand, the last being what is chosen for hyacinth culture. It is prepared by being given a heavy application of cow manure. The bulb growers use manure lavishly, and it is brought to the fields in boats. It may come from Leyden, Amsterdam, or Rotterdam, as these and other cities are accessible by water, through the network of canals which penetrate the country.

Let us now look upon a field on which manure has been placed, ready to be spread and dug in. The quantity put on seems large, but this is necessary, especially for hyacinths, which must be grown in sharp sand without admixture of loam, peat, or clay. So essential is this condition held to be that the leading hyacinth specialist in Holland showed me with much enthusiasm a field (or rather a series of plots intersected by canals) covering forty acres, from which three feet of mixed alluvia had been removed, in order to reach a stratum of sand suitable for hyacinth culture.

We shall now look at one of the reclaimed fields on which workmen are engaged in planting bulbs. Hyacinths, narcissuses, and tulips are set in trenches six inches deep; crocuses, scillas, and snowdrops in trenches three inches deep.

Before cold weather sets in, all the planted fields are thickly covered with reeds, which grow along the edges of the canals, and are also cultivated in the north of Holland for this use.

Great care is taken to prevent frost from reaching the bulbs, for as they are planted early in autumn they soon make long roots, and frost reaching the bulbs would raise them up and detach them from their roots. I believe that among our New England cultivators this is a frequent cause of failure to obtain the best results.

The spring flowering bulbous plants are rapid growers, requiring a large supply of nourishment, and unless their roots are well developed in advance of the top, and kept in good condition, they will be unable to furnish the needed food, and failure, or partial failure, will result.

Growers who would sell direct to seedsmen must grow and be prepared to furnish bulbs of from four hundred to five hundred

sorts of hyacinths, which have distinct and well-defined characteristics. In fact, the growers and many dealers can distinguish many of them from the appearance of the dry bulbs.

Fifty years ago the growers generally had longer lists than now, and the double sorts were most esteemed. Now the single sorts are preferred, as they usually produce larger and fuller flower spikes.

The propagation of hyacinths is by offsets, which form at the base of the bulbs. For propagation the largest bulbs are selected. Each bulb is cut across the base several times, or has the base hollowed out, to increase the number of offsets. They are allowed to dry in the sun, and are planted in September or October.

The hollowing-out method gives more offsets than the cross-cutting, but it does not succeed with all sorts, and the bulblets being smaller take a year longer to attain full size.

The variety of which the greatest number is grown is the single pink Norma, and when one grower gives an estimate of the extent of another's hyacinth trade he states how many thousands of Norma he grows, just as our printers estimate the work of a compositor by the ems he sets. I know of one grower whose trade requires 80,000 Norma annually, the product of about two acres.

Now we see a field of tulips in bloom. In the distance is a stack of reeds which had protected them during winter, and which are stacked for use again. They can be used for three or four years, and look not unlike small cane stakes, such as we use for staking plants.

Next we see a field bordering on the Lake of Haarlem district. In the distance you can distinguish vessels on the great canal, while the dark lines running across the fields represent smaller canals. You can also see a windmill used in pumping water from the smaller canals into the main one.

Now we see a more extensive field of tulips in bloom. The trees on the right are but single rows of poplars on each side of a canal. The poplars are trimmed each year, and while affording protection from wind do not sap the ground.

The average grower must cultivate in all about four hundred and fifty varieties of tulips. Of these about four hundred are varieties of the ordinary garden species, *Tulipa Gesneriana*, which was introduced into Western Europe from Turkey in 1554.

There are about fifteen varieties of the dwarf sweet-scented Duc Van Tholl tulip (*T. suaveolens*), which in Europe are extensively used for winter forcing.

The famous Semper Augustus tulip, which during the tulipomania in Holland was the most prized sort, and which sold for about two thousand dollars apiece, is not now to be found.

The propagation of tulips is by bulb offsets, each root producing two, sometimes three, saleable bulbs, and perhaps one or two of smaller size which require another season's growth before they are fit for market. They are also easily raised from seeds, the seedlings coming at first self-colored. While they remain self-colored they are known by the name of "Breeders." These have been made very popular the past four or five years by giving them the name of "Darwin" tulips. After a few years of cultivation they break away from their original color.

If a white tulip becomes striped or marked with another color it is called a Bybloemen. Of this class the rose or red-tinted Bybloemens, known as "Roses," are perhaps the most desirable. A tulip having a yellow ground marked with another color is called a Bizarre.

In the early part of this century tulips having variegated flowers were the most esteemed. Today such self-colors as Gold Prince, the beautiful rose-carmine Proserpine, Vermilion Brilliant, and the White, Yellow, and Scarlet Pottebakkers are the most prized. There are, of course, exceptions; the most conspicuous is the noble Kaizerkroon — crimson, with a wide edge of yellow.

From a million and a half to two millions of tulips are now required annually to supply New England.

The tulip has become, with us, the most popular of the spring flowering bulbs and, compared with other spring bulbs, we use a larger proportion of them than other nations do.

As we look at these views we get an idea of the vast area devoted to tulips. Here is a view taken from near the railway station at Venenburg, showing in the distance the village of Hillegom.

Here we have a view of beds of tulips, which shows the single rows of poplars dividing fields or bordering canals like latticed fences.

Here is still another field of tulips, taken so as to show one of the canals, which is probably ten or twelve feet lower than the great canal.

At the present time daffodils are receiving more attention from hybridizing than any other class of bulbs. There are now in Holland yellow daffodils as much larger than the Emperor and Empress varieties of *bicolor* as these exceed the old Trumpet Major. One, Narcissus Victoria, has already been offered, and others will follow when the stocks become large enough.

Although the largest and finest bulbs still come from Holland, daffodils are extensively grown in England, Ireland, the Island of Guernsey, and France, and in talking recently with Dr. Campbell, of the University of California, he said that he believed his State would within a generation supply a large proportion of the narcissuses used in this country.

I cannot pass this part of our subject without expressing our indebtedness to Mr. Peter Barr, of London, who has done so much to arouse interest in daffodils. He offered substantial prizes for the best collections of them at the London exhibitions, at which his son Rudolph, when only ten years of age, was a frequent competitor; but his father insisted that he should carry the flowers in a basket without the names, and that he should name them himself in the show room. I have seen him thus name over sixty sorts. The beautiful Poeticus Poetarum was saved from extinction by Mr. Barr, and he has added many choice sorts to modern collections.

Japanese lilies are seldom grown in Holland now; the Dutch dealers find it cheaper to import them from Japan. They are usually shipped by way of Vancouver and New York. The Dutch still receive many orders for them from this country, which involves the shipment of them from New York to Holland and back needlessly.

It is a singular fact that double snowdrops do not succeed in Holland, and that the Dutch obtain the bulk of their supply from Lincolnshire, England, where for many years they have been collected by the chimney-sweeps as they travel about the country, and, when dried and cleaned, are sold to the bulb dealers in Holland.

Let us look upon one of these fields three months later. We see a score of men on their knees, some of them having their hands buried in the sand. It is harvest time, and they are lifting bulbs. No spades or forks are used lest the bulbs should be injured; the men dig them out of the loose sand with their

hands. The bulbs are laid carefully in baskets and conveyed by boat to the warehouses.

The workmen still wear wooden shoes, not altogether for economy; they are believed to afford better protection from rheumatism, which is prevalent in Holland, than leather. They are made of willow wood, which is light and not liable to crack.

The bulbs are conveyed by boat from all parts of the farm to the warehouse, a canal leading up to or inside of the buildings. These large storehouses, two stories high, are shelved with strong slats from the bottom to the top, the shelves being eight inches apart. As you look through the windows you can see the shelves packed with bulbs to dry.

The lower floor is invariably devoted to hyacinths, which are never laid more than two layers deep on the shelves. Tulips, being lighter to handle, are taken upstairs and similarly stored, but four or five layers deep.

Great care is exercised to have the freest circulation of air through the building, but no direct sunlight, which would crack the skins of the bulbs.

When sufficiently dry the bulbs are counted up into lots of perhaps 100, 250, or 500, as convenient, and placed in bags which are left open. When they are needed for shipment buckwheat chaff is put in to prevent bruising, and they are then packed up for transport over the world.

The value of bulbs exported annually from Holland aggregates $3,000,000. England takes half of the crop, the United States and Germany each to the value of about $300,000, France and Russia each about $200,000, and Norway and Sweden together about $150,000 worth.

On the southerly side of the Lake of Haarlem are the well-known nurseries of Boskoop. There are over four hundred nurserymen here, and they cultivate land which in almost any other part of the world would have remained salt-water marsh. So low was this region that to get land at all, the canals, which elsewhere are usually six feet deep, had to be dug eighteen feet deep, and frequently they had to be paralleled. The land has been made in plots about a hundred feet wide and half a mile in length, the land surface being about eighteen inches above the water in the canals.

The soil is chiefly peat, which is improved by having sand or

clay mixed with it. It is very rich, and the deposits from the bottoms of the canals, which are dredged out every autumn, form sufficient dressing.

Here we have a field of clematis, the growth of a single season, and here is another view showing clematis of one season's growth.

Plants make wonderful growth here — everything seems to luxuriate; and as we travel through these interesting fields and cross the canals on little plank bridges from plot to plot, and nursery to nursery, we note how carefully every foot of the precious earth is utilized.

As we look at another view showing large plots of Chinese lilacs let me tell you that very few (if in fact any) of these Boskoop nurserymen carry stock of all the lines they catalogue. Each grows a few specialties and buys the rest of his neighbors. These nurserymen have formed a society known as the "Association Flora of Boskoop," which seeks to promote their interests at home and abroad, and regulates the terms of sale between themselves.

The moist condition of the soil of the Boskoop nurseries, due to its being a spongy peat and its surface from sixteen to twenty feet below the Amsterdam high-water mark, has its effect upon the plants grown in it. They develop softer wood and the roots are less branched than those grown on higher and drier land. I have seen hybrid roses with stems twice the usual thickness and almost as soft as cabbage stalks. These frequently cause disappointment when transplanted to drier soils in hotter climates. For New England, English or French grown roses are much to be preferred.

We see in these nurseries many plants which are not hardy enough to survive our winters; such as *Araucaria imbricata*, *Aucuba Japonica*, variegated hollies, and golden thuja, for which there is a large demand, chiefly from England.

The visitor to Boskoop, if going from Haarlem, will find it most convenient to make the journey by steamer in the great canal, which is really the highway, lined on each side with interesting and picturesque scenery such as is found only in Holland.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 22, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE in the chair.

The following lecture was delivered : .

ORIGINATING NEW VEGETABLES.

By Hon. AARON LOW, Hingham.

Mr. President, and Members of the Massachusetts Horticultural Society: In coming before you today to speak upon the subject of Vegetables, their Originating and Manner of Improvement, and the Varieties best adapted for General Cultivation, I am aware of the great importance of the subject to the farming community, and to every one who plants a garden. I do not presume to be authority on strictly scientific methods of procedure, but will give a brief history of my own experience and practice for the past forty years.

I shall take it for granted that you wish the subject treated in a plain and practical manner, so that every one present can apply the suggestions and ideas advanced to his own operations on the farm or in the garden.

All discussions before agricultural or horticultural meetings should have this aim in view, so to present the subject as to enable each member to acquire and apply the knowledge thus presented, to better methods of culture, in the use of all labor saving implements, and in planting such varieties of vegetables as shall give larger and better products, quicker sales, and thus an increased profit on his labor.

Every market gardener often notices a variation among vegetables of apparently the same variety.

One of the first principles of Nature is reproduction, and the production of new varieties by cross-fertilization or hybridization.

The improved varieties introduced during the last twenty years have been obtained by these two methods. But the searchers after new varieties should bear in mind that a sport which appears to be an entirely distinct variety will require years of careful and intelligent training to establish its points of variation and excellence.

In training to establish a cross as a distinct variety we should have in our mind an ideal as to form and the other more prominent characteristics we desire our new variety to attain, and selecting samples that come nearest to the desired points, for seed stock, persistently follow on that line until our object is accomplished.

New varieties, although apparently well established, are apt to sport back to one or the other of the original kinds from which the cross was obtained, and require careful watching for years to eliminate such points as appear undesirable.

As every year brings forward new kinds of vegetables, the up-to-date market gardener must keep himself well posted as to the merits of such varieties, and their adaptability to his requirements.

Although there are new kinds brought out which are no better than old and well-tried kinds, still among the new claimants for public favor we often find varieties with decided improvements on those previously known.

As a general farm product there is no one of more importance than the Potato. I would first call your attention to it. The early history of the potato is involved in obscurity. It was introduced into Europe at about the end of the sixteenth century. But it was a long time before it was much used as an article of food by the masses; and it was even as late as the commencement of the eighteenth century that it was pronounced by a College of Physicians in France to be poisonous and unfit for human food.

It seems strange to us that it should have taken so long to discover its merits as an article of food, when at the present time it is deemed indispensable for daily use upon the tables of rich and poor alike.

In speaking of the potato and its cultivation as usually performed we should infer that the potato itself was the natural seed, but such is not the fact. We propagate it by slips of the tubers, as we do other tuberous-rooted plants. But if we wish to produce a new variety we must take the natural seed balls.

It is a well-known fact that the varieties of potatoes now in cultivation very seldom produce the natural seed balls.

Those of us who remember the old Merino or Long Red potato, cultivated some forty or more years ago, know that, while it was

immensely productive in tubers, it was equally so in its crop of seed balls. Whether the long continued cultivation of the potato by divisions or slips of the tubers has suppressed the natural tendency to perfect its seed, or whether this effect is due to other causes, we are unable to say.

If we wish to produce new varieties we must plant the kinds of potatoes that usually produce the natural seed. The seed balls should be gathered when ripe, seed cleaned from the pulp, dried, and preserved till spring; then planted in a bed prepared for that purpose, giving close and careful cultivation, and their further development awaited.

The first year the plants are not usually very strong, and the result of our labor is a crop of rather poor looking little potatoes, from the size of a pea to an inch in diameter. The second year the seedlings increase in size and development, and we find a great variety in form and color. It usually takes from three to five years to develop seedling potatoes so as to be able to decide as to their merits.

The introduction of the Early Rose marked a new era in the cultivation of the potato, that variety proving superior to every other previously known, not only in quality, but in earliness and productiveness. Its introduction has been of great importance to the country, both as to its perfect adaptation to all sections and the large increase of wealth its cultivation has brought to the people. Its great success as an early potato induced many growers to attempt to produce new kinds from it that would surpass the original.

As the tendency of potatoes after a few years of cultivation is to deteriorate, it becomes necessary to have new varieties to take their places. Most of the kinds cultivated twenty years ago are now superseded by varieties of recent introduction. In the last half-dozen years we have had a number of new varieties of superior excellence in all of the qualities of first-class table potatoes. As most desirable of late introductions may be named the New Queen, Early Essex, Carman No. 1, Carman No. 3, Banner, Somerset, and Enormous.

From the experience of the past few years it seems indispensable to have our crop of potatoes planted very early in the season, so as to have them well advanced in growth to escape the ravages of the potato beetle, and the blight which usually appears in the

latter part of July or during August, and is apt to be followed by more or less rotting of the potatoes. Two important advantages in the early crop are that the price of potatoes is much higher than later in the season, and the land can be used for a second crop of celery or late cabbages with but little cost of cultivation, thus adding quite an amount to the yearly profits.

Another method I have practised very satisfactorily is to plant about the fifteenth of June every third row with squashes ten feet apart in the row. The potatoes being harvested early, the squashes will occupy the land later, and produce about as large a yield as if no other crop had preceded them.

In connection with the cultivation of the potato the past season, I have tried experiments in preventing scab on the tubers and blight on the vines. One of the most highly recommended methods to prevent scab is soaking the seed potatoes in a solution of corrosive sublimate according to the formula of the Experiment Station at Amherst. Another preventive is flour of sulphur, scattered in the rows when planting the potatoes. I could not see any perceptible difference in the results of either method, as the potatoes in both cases were free from the scab, while where neither was applied many of them were scabby.

In making an application of the Bordeaux mixture to the vines to prevent blight it is important that rain should not follow at least under twenty-four hours, as it will wash off the mixture before the desired effect is accomplished. In the three applications I made the past season rain followed within a few hours each time, and thus destroyed much of the effect of the mixture. Under favorable conditions I think the mixture would materially check the blight.

For a number of years much interest has been manifested in growing potatoes with commercial fertilizers. My experience has fully convinced me that the same amount of money expended for some reliable fertilizer, and applied in competition with stable manure, will give much better results in good-sized smooth potatoes, and, I think, of better quality.

Quite an important consideration is the small expense of applying a single ton of fertilizer to an acre, as compared with the cost of applying eight or ten cords of manure.

As a vegetable second in importance to the potato we may reckon the Cabbage.

In the vicinity of large markets a crop of early cabbages is one of the most profitable grown, as the demand is large and prices high.

New varieties can readily be produced by cross-fertilization, either by transferring the pollen from one kind to the other by a camel's-hair brush, or setting two kinds side by side, when the bees or the wind will make many crosses, by carrying the pollen from one to the other. Varieties can be greatly improved by careful selection of the best type of heads for seed, and continuing thus for a number of years you will find much improvement on the original variety.

For two or three years past there has been sold in the spring in the markets of New York, Philadelphia, and Chicago a variety of cabbage imported from Europe, and bringing a much higher price than any kinds of American growth.

Last spring I was pleased to receive from a seed grower in Europe a package of a number of kinds of European cabbage seed for trial. Starting the seed under glass, for medium early, I set out a piece of the different varieties for trial.

On their maturing I found two of the varieties to be extremely solid and hard, and to weigh a third more to a barrel than our best American cabbages, and to keep longer without bursting or decaying than our best kinds. The two varieties which proved the best are catalogued by European seedsmen as Amager and Solid Emperor.

An experiment conducted the past season in growing cabbages in a method rather different from that usually practised proved so satisfactory that I will briefly give the method employed. Having a piece of light loam land with a crop of winter rye standing upon it, from two to three feet high, I ploughed it seven or eight inches deep, burying the rye entirely out of sight.

The piece was well harrowed and furrowed in rows three feet apart on the thirty-first of May. Blood, bone, and potash fertilizer was scattered in the rows, at the rate of half a ton to the acre. The fertilizer was well mixed with the soil before setting out the plants on the first of June.

The plants started nicely, and grew rapidly; evidently the decomposing rye beneath was a very important help to them. The piece was cultivated twice, and once hand-hoed. The varieties grown were Perfection Red, Succession, All Seasons, and Stone-

Mason, with one hundred plants in each row. The entire piece seemed to be free from all destructive insects, as every plant grew undisturbed by any injury whatever, and every one made a large, solid head.

In all the years which I have grown cabbages I have never seen a piece having as uniform a lot of large, solid heads as this, and certainly it is strong proof of the benefit of ploughing under green crops, especially on lands long cultivated, and to me was conclusive evidence of its utility.

The above-mentioned land has been cultivated continuously since 1892, and during that time has not had any stable manure used upon it.

Perhaps I might state here that blood, bone, and potash seems to be a special fertilizer for growing cabbages. Although they did well on other fields, the above piece was far the best, which could only be accounted for by the decaying vegetable matter beneath, in addition to the fertilizer applied.

Among the luxuries of the olden time in the songs and verses of the poet were often depicted in glowing colors the merits of the golden pumpkin pie.

Since the innovations which modern customs and usages have made in the practices of that far away period of our ancestors, the Squash has succeeded to the honor sung of that old time favorite. At the present time every market gardener needs to plant quite a piece of early and late squashes to supply the daily demand of his customers.

Without doubt the best variety for early planting is the Marrow. Of the various strains of that valuable kind the Boston Marrow and Dunlap's Prolific are the best. The latter is of recent introduction, a very early variety, of fine color and quality, and immensely productive.

In passing over a field of American Turban squashes, in 1879, I found a vine with a number of nice, handsome squashes so decidedly different in appearance from the rest of the field that I stopped to examine them.

I decided from their form, varied color, and hardness of shell that they were a cross between the Turbans and Hubbards growing in a field near by. All of the squashes on this original vine, three in number, were of equal size, weighing about ten pounds each, and all growing on the vine within the length of four feet.

The three squashes seemed to partake about equally of the Turban and Hubbard characteristics. They retained the form of the Turban, and mostly its color, with the hard shell of the Hubbard. The blossom end was colored like the Hubbard, and stripes of the same color radiated to the stem. I decided that if I could train this cross to retain the hard shell, delicious flavor, and sweetness of the Hubbard, and the form and golden color of the Turban, it would be a decided novelty and a valuable acquisition. It was some three or four years before I succeeded in fixing permanently the above desired qualities. The rapid dissemination of the Essex Hybrid squash, after its first introduction, and the continued increase of popularity which it has attained, have fully sustained the high claims which were made for it on its first appearance.

As I have before remarked, it is a well-known fact that almost all crosses of vegetables are very apt to sport back to one of the varieties from which they were derived. I have every reason to believe that my last introduction, the Bay State squash, was simply a sport backward, so to speak, showing a stronger and more marked development of its Hubbard parentage. The fact that not a single Hubbard squash had been grown in the vicinity for a number of years tends to corroborate the above view. When first found it was growing in a field of pure Essex Hybrid squashes. Three very even sized squashes of about ten pounds' weight each were growing upon a single vine within the space of three feet. It is a singular fact that the original vine of both the Essex Hybrid and Bay State had each three squashes growing on the vine within the length of three or four feet, and almost identical in form and size, the only apparent variation being the color. The color of the Bay State was distinct from every other squash then known, being a blue shade with a peculiar greenish tinge. Another point that seems strongly to sustain the foregoing theory is this: no matter how careful and particular you may be in selecting your Bay State colored squashes for seed, you will find more or less sporting back to the Essex Hybrid in color, but the same shape always retained. The prominent points of the Bay State are these: earliness and quick maturity, great productiveness, good keeping, and first-class quality.

As a late winter squash the Hubbard takes the front rank. It is a later variety than either of those noted, and should be planted as early as possible after the season is warm. This choice variety

was introduced many years ago by Mr. Gregory, of Marblehead.

Three years ago I found in my Boston Marrow squashes a peculiar sport — a squash having marked characteristics of the Boston Marrow at the stem and terminal point, and the singular wrinkled markings only to be seen on that variety. The color of this sport is a dull green, unlike any other I ever grew. I have grown it for two seasons, and find it to be of excellent quality, fine grained, and very sweet. In its sporting for the two seasons I have grown it, it has shown only its Marrow parentage. In the coming season I am in hopes to establish it as a distinct and valuable variety.

I do not think that in the entire list of cultivated vegetables there is another so hard to preserve in purity as the squash family.

From the peculiar formation of the blossoms of this family of plants they are not as readily fertilized by the wind as are many others. But to remedy this defect Nature has furnished another way, by means of the bees that are continually passing from one blossom to another, the fine pollen dust adhering to their legs and bodies, and being thus carried from one field to another quite distant. Therefore, although we may isolate fields of squashes as far from other fields as possible, we are not sure but we may have more or less of this cross-fertilization by the bees, and the very means by which Nature insures the perfect fertilization of the blossoms may be the chief cause of the sports and crosses so common in squash culture, and by which new varieties can be multiplied at will.

During the summer and early fall there is quite a large demand in the market for Melons, and on land adapted to grow good melons they are often very profitable.

To grow melons to perfection requires a warm, rich soil, with plenty of nitrogenous manure, to give the vines a strong, vigorous growth. To have melons early in the season the seed should be started under glass in pots or small plant boxes made for that purpose and transplanted from them to the open ground in June. A hot, dry season is better adapted to produce melons of good quality than a season like that of 1897. The past season was particularly unfavorable for the melon crop both as to quality and amount. On an experimental piece of Improved Orange

Christiana, where a fair crop would have been one hundred boxes, but fifty were produced. One gardener who put out eight thousand hills, started under glass, had a complete failure, not selling a single box.

A few years ago I planted half an acre of Early Christiana melons on the eighth of June, following a crop of spinach. A special vine fertilizer was used in the hill. From the half acre we picked two hundred boxes and sold them at an average price of $1.25 a box. The season was hot and dry, a favorable one for melons.

Of the different varieties Extra Early Hackensack, Montreal Nutmeg, and Arlington Nutmeg of the green fleshed, and Improved Christiana, Emerald Gem, Shumway's Giant, and Tip Top of the salmon fleshed kinds, are the most desirable.

In some markets the green fleshed melons are most in demand, but the salmon fleshed are considered the best flavored.

I have no doubt that it is within the memory of many of those present when the Tomato was introduced as an article of food. It was used at first as an ornamental plant in the garden, from the beauty of its bright red fruit, and was called "Love Apple."

At its first appearance its fruit was rough and ill-shaped, and but a small portion was fit for market. It soon became more widely known, and was called for to use in various ways upon the table.

Its cultivation increased rapidly, and the demand for seed infused into the heart of every seedsman a desire to improve the varieties then known, by bringing out new ones as improvements on the few kinds then cultivated.

There soon appeared many new tomatoes, said by the introducers to be superior in earliness, smoother and better in shape, more solid in flesh, and of finer flavor and quality than any kind previously known. Among them were a number of decided superiority in all of the points of a first-class table tomato.

One of the first improved large tomatoes was the Trophy. This was a very large, solid fleshed, red tomato, of excellent quality, but not coloring well around the stem. In 1860 the Essex Smooth Round tomato was brought out. This variety is of medium size, bright red color, always smooth and handsome, and is at the present time one of the best forcing tomatoes known. In 1870 the Paragon was introduced, and has proved an excellent tomato.

In 1874 I produced the Essex Hybrid, the first large purple tomato known. This was a cross between the Essex Smooth Round and Lester's Perfected tomato. After proving this variety for three years, and finding it to be first class in every respect, I introduced it to the public in 1878.

It has proved wherever grown to be one of the best and most profitable tomatoes in cultivation.

In 1875 the Acme was introduced by Livingston. This is a smooth purple tomato, of good quality, but inclined to spot with black rot on the fruit. Livingston brought out successively the Perfection in 1880, Beauty in '86, Stone in '91, Royal Red in '92, Buckeye State and Dwarf Aristocrat in '93. All of the above are excellent varieties. The Stone is a large late tomato, handsome in shape and color, of first quality, and one of the best varieties known.

Dwarf Aristocrat is of a different class — one of the dwarf varieties, having a stout upright vine, and can be set nearer together than the larger growing vines. The tomatoes are of a bright glossy red color, early, of good size and shape, and of fine quality. I shall place this as one of the best.

In 1892 I had the honor of bringing out a new early tomato, the Comrade. The experience of many prominent gardeners in different parts of the country has proved this to be the most profitable early tomato grown. The fruit is of good size and shape, of bright red color and fine quality, and remarkably free from the black rot, a serious trouble with many early varieties.

I have another late variety which I originated a number of years ago, the G. A. R. tomato. This is a very large, round variety, remarkably solid in flesh, of a bright glossy red color, and of exceedingly fine quality. In my experimental plot of some thirty odd varieties this was the most uniform in size and shape of any. As a late tomato there is no other variety which will produce as large a yield of first-class tomatoes as this.

A few years ago a new tomato was introduced by a seedsman in Philadelphia as the earliest, largest, most productive, and handsomest tomato known, and far superior to every other variety in cultivation. In thoroughly testing this tomato, the New Imperial, for two years I find it not as early as represented, but in many respects all that was claimed for it.

There are many other tomatoes of merit cultivated in various

parts of the country, but to the market gardener the above specified varieties are as good a selection as can be made, as he can choose from them either the bright red or the purple varieties, as the fancy of his customers may call for them.

Within the last few years there has developed in a number of sections of this country a disease or blight which appears upon the tomato vines, and which I fear may prove a serious trouble. After its first appearance in July it spread so rapidly that it ruined many vines, and greatly damaged the crop.

From the experience of the past season I think we shall be obliged to take measures to prevent the blight on our tomato vines in the same manner that we do on our potatoes.

As I usually grow tomatoes largely I shall take the precaution, the coming season, to spray with the Bordeaux mixture, before the blight makes its appearance, trusting to a thorough application to prevent its getting a foothold. Still I am fearful that the easy cultivation of the tomato has passed by, and that in the future we shall be obliged to watch our tomato fields as sharply as any crop we grow.

The tomato can be improved by two methods. If new varieties are desired, then by cross-fertilization, and planting the seed thus fertilized, and from its product selecting the best types of the qualities desired. Training those for a number of years, you can establish new varieties.

The other method is by selecting the most perfect fruit for a number of years, following on that line persistently, until your object is accomplished.

In this manner new varieties can be produced from all classes of vegetables, simply by following the laws which Nature has made to attain given results. There is a peculiar fascination in the evolvement from the multiplicity of Nature's crosses of a new variety, and the establishing of such, with fixed and permanent qualities, thereby adding another kind to the food products of the world.

One of the most important crops produced in this country is Indian Corn. In all the species of grain or vegetables cultivated there is none more interesting in its manner of growth than this. In the manner of producing its crop this plant is unlike most others, having two distinct flowers, male and female, on the same stem.

The male flowers are in a panicle on the top called the tassel, and the female flowers in a spike on the stalk below, called the ear. The silk consists of the pistils of the female flowers.

When the tassel is in blossom the pollen dust falling on the silk of the ear is transmitted by a tiny thread of silk to each and every kernel on the ear. If not thus transmitted the kernel is abortive, and fails to mature.

A very interesting experiment to demonstrate the method which Nature takes to produce new varieties by cross-fertilization can be readily made by any one by planting two rows of sweet corn, of two different kinds, beside each other. To have the result more distinctly shown, plant one row of the black Mexican variety and the other of a white variety, such as the Crosby, coming into tassel at the same time.

On ripening, you will find the ears of the black variety with kernels of the white corn, and the white ears with kernels of the black; also some kernels apparently partaking of a mixture of both.

This experiment will show how unerringly Nature's laws act to produce given results, and that with all varieties of vegetables this wonderful process of reproduction is continually evolving new forms and varieties before unknown. Where the pollen of one variety falls on the silk of the other, the kernel connected with that silk will be changed by cross-fertilization.

If any one desires to attempt to produce new varieties let him study into the methods which Nature takes to perform her wondrous works, and the better he can understand the working of her unchanging laws, and infuse into his own soul the inspiration of that wondrous life that lives on every hand, the more will his success be assured, and the more complete his triumph.

Discussion.

The Chairman said that he considered the subject of originating new varieties of vegetables a very important one, and spoke of where the new varieties come from. He thought Middlesex County farmers considered that most of the new sorts had come from there. He took pride and pleasure in the large number which had come from Essex County. The first Marrow squashes brought into the Boston market grew in Swampscott, from seed

raised by his father. The Hubbard squash was found in the garden of Old Mother Hubbard, in Marblehead, and introduced by J. J. H. Gregory. The standard variety of cabbage known as the Mason also came from Marblehead; it was improved by a neighbor of Mr. Mason's, and then called the Stone-Mason cabbage. The Danvers onion was perfected by David Buxton, of Danvers, now Peabody. The Danvers carrot was grown by Nathan Bushby, of the same place. The Marblehead corn was introduced by J. J. H. Gregory; it is very early and unfit for eating, but will do to sell. The Crosby corn was originated in Marblehead, by Mr. Wyman (who moved to Cambridge) and perfected by the late Josiah Crosby at Arlington. Many other varieties have come from Essex County. It is an honor to the county to have developed standard varieties of vegetables which are the leading kinds in the country. Among other varieties from the vicinity of Boston is Fottler's early cabbage. At one time the seed of this variety literally brought its weight in gold. Its origin is somewhat doubtful.

Mr. Low said that onions are different from other vegetables; all are improved by selection of old sorts rather than by new ones from seed. Mr. Buxton has increased the depth and measuring capacity of the Danvers onion, retaining the quality. A friend sent the speaker eighty beans, the handsomest he ever saw; they were all marked alike, and he planted them in a cold frame; the result was more than twenty distinct sorts, so he gave up attempting to improve the variety. They had been cross-fertilized, and could not be trained to a fixed variety without years of work. Potatoes are improved by selection.

Rev. Calvin Terry said that when a boy he planted potato seed, and got potatoes which were the same as the parent; afterwards they changed and he thought that they mixed in the ground. He asked whether potatoes mix through the seed alone or through the tuber.

Mr. Low did not think that they mixed in the tuber; the seed might have been influenced the year before. There is no mixture except through the flowers. The potatoes we grow now seldom flower well, and we are not likely to have seed balls. It is not in accordance with nature that potatoes should mix in the tuber.

Samuel H. Warren asked: Why not as well as corn the first year?

Mr. Low said that the corn kernel is the seed; the potato tuber is not. The squash will not change the first year, but will become more developed than either parent. Corn develops seed the first year. You might plant some of the white kernels which were on the Mexican Black ear when crossed with the Crosby as suggested in the lecture, and the result would show a great variety, easily seen, as the colors can be distinguished.

Varnum Frost questioned whether these crosses had improved the eating qualities of the squashes, and spoke of the poor quality of the Marrow and Hubbard squashes of today.

The Chairman said that the Boston Marrow does not compare in quality with the original, which was smaller, seldom weighing over eight pounds. The Boston Marrow now grown, being larger, gives a better crop in weight, but not in quality. It is sold by the ton, and that is why they have deteriorated. The old-fashioned Marrow is just as good now as it ever was. The Danvers onion is not of the first quality, as the two outer layers are thick and tough and unfit to eat. The smaller ones do very well. It is a good onion to sell. The Cracker onion is much superior in quality. It is tender and delicious, but too delicate for transportation.

Joshua C. Stone did not want people to go away thinking that every good vegetable originated in Essex County. The hybrids have ruined the market. In old times a man would buy a barrel of squashes and carry them home and eat them.

George D. Moore thought that the growing and fertilizing have a good deal to do with the quality of squashes: we cannot grow good ones in old gardens; you want new sward land to get them of good quality.

Mr. Low said that nitrogenous manures produce great quantities of vine, but squashes of poor quality. Squashes are grown today not so much for quality as to get good crops to put on the market. The poor quality is due to the cross-fertilization; different varieties of squashes grow side by side, and the variety deteriorates.

Mr. Frost said that Livingston has sent out too many varieties of tomatoes. You can take a dozen of his varieties and mix them together and then you cannot pick them out. He asked why this was.

Mr. Low replied that he did not know whether you could elimi-

nate this undesirable quality that has been brought out or not. Of two white potatoes no difference in growth can be seen until flowers appear. In one the flowers are white, in the other purple; the tubers are both white. In tomatoes a casual observer might see no difference, but a difference may be distinguished in the calyx, etc.

O. B. Hadwen asked whether squashes can be improved by thinning. They are now almost unfit for eating, owing to the inferior quality.

Mr. Low was inclined to the opinion that the quantity of the fruit would be increased, but the quality would not be improved. Eliminating too much moisture would probably do that. In a dry season the crop of melons is small, but the quality is much better thre in a wet season.

Mr. Warren thought he had gained a point in the discussion. He had planted seed from the second crop of Enhance strawberry, a late variety. To his great surprise the new seedling was to all appearance the same as the parent. He accounted for it by there being no other kind near.

Mr. Low said that you must have some other variety in pollen at the same time. There were no other strawberries in bloom. Potatoes will vary if not cross-fertilized, but if you wish to fix any particular point you must fertilize with pollen of the variety possessing that quality.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 29, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE presiding.

The following lecture was delivered:

NUTS AND NUT CULTURE.

By FRANK M. BARTRAM, Parry, N.J.

In 1897 the United States imported over $2,200,000 worth of nuts. When we consider that most of this expenditure was for kinds that may be easily and abundantly raised within our own borders it does not speak well for our boasted enterprise. It seems incongruous to say so much of opening up and fostering markets

abroad for the agricultural products of the United States when we ignore the expenditure of our own people going to foreign purses. It is the varieties of nuts that enter most largely into United States commerce and consumption that we will consider here — those whose culture has already become a reality in some part of the country. The industry is comparatively young. It is scarcely thirty years since nut culture has assumed commercial importance. The Almond and Persian Walnut in California, and the Pecan in the South, are in the advance of the movement. Much interest is being taken in Chestnuts throughout the Atlantic States.

The claims of desirability of nut culture, beside the enticing profits, are numerous. The doctor and the lawyer depend for their livelihood upon the misfortunes of others, while the nut culturist is ever happy in contemplating the joy and good will attending the use of his product. Trucking requires ground of great fertility, and suitable for high culture; nut trees are not fastidious, and hillsides are often their home. Truck must be planted annually, while a nut orchard might almost sing with Tennyson's brook, "Men may come and men may go, but I go on forever." Nuts are not perishable; they may be stored and marketed at one's pleasure or need. They are a concentrated product, the freight charges on which are much less in proportion than on more bulky products. Not requiring constant and detailed attention, they will appeal to the large planter; while on the other hand these virtues will suggest nut culture as a side issue, for on many farms land is found, now unremunerative, admirably suited to nut trees, especially hillsides, and here the forester's attention will be arrested.

In the first place we are aware of the benefits of forests, principally in moderating extremes of flood and drought. Many kinds of nut trees are adapted to forestry planting, and their timber is highly esteemed; for instance the oak, beech, chestnut, hickory, and walnut, and even the hazel bush finds a place as a pioneer in soils too barren for other trees, and by rapidly adding organic matter in the abundant crop of leaves prepares the way for the more valuable timber trees. In a monograph on forestry prepared at the request of the Governor of Pennsylvania a few years ago, every deciduous tree named is a nut bearer. And forestry should commend itself to owners of the many hillsides in which New

England abounds, so well adapted to this, while so poorly suited to many branches of agriculture.

The ornamental value of certain nut trees is so very far beyond question that thoughtlessness and custom alone must be held responsible for depriving us of so much possible enjoyment of beautiful trees. I know I am treading on dangerous ground even to intimate anything disparagingly of the elm to New Englanders, but when in Boston last summer the contrast in the appearance of the foliage between the elm and the beech was not to the discredit of the latter. The elm has ever belonged to that class of trees that bears "nothing but leaves, nothing but leaves," and the imported beetle is vigorously attacking even this glory.

Large and spacious grounds about a home are in sad minority. The area is limited that surrounds the vast majority of homes, and the suburban home for the man of moderate means is now anxiously sought for and frequently acquired. He wishes to adorn his surroundings with choice trees, and if he will plant a chestnut or hickory (or, where they will thrive, a Persian walnut or pecan) he will have a tree of whose appearance he may be justly proud, and whose fruit will be a source of continual pleasure to young and old. In parts of France the chestnut trees about the home furnish much of the food for the family, and the surplus is sold.

The Cocoa nut is the fruit of a stately palm, growing to a hundred feet in height, and a foot in diameter, unbranched. The leaves are at the top only, in a whorl; each composite leaf is from fifteen to twenty feet long and three feet broad. From the axils of these spring the spikes of blossoms, which come in succession, so that at any time the tree has fruit in all stages of development. Some trees are claimed to bear as many as three hundred nuts a year. The area suitable to its successful culture in America is small, confined to parts of Florida.

The Hazel is another common nut not yet submitting kindly to American culture. The Puget Sound region is the most promising locality. The hazel is subject to a blight; and the lack of simultaneous blooming of staminate and pistillate flowers and lack of pollen induce some to get branches of wild varieties to tie in bushes at home, or to plant a wild bush in a cultivated orchard.

The Indians of the Southwest use the nuts of a species of pine

as food or for a relish. Roasted like peanuts they are said to be delicious.

The Leechee nut has a round rough brown casing over an edible pulp. This is whitish, but becomes brown when the nut is kept for some time. In the centre is a single seed. The fruit is very popular in the Orient and may now be procured here. It is called also the Chinese nut. Trees of it are growing in Florida and California.[1]

The Ginkgo, or Maiden Hair tree, from Japan, is of upright, very narrow growth; as an ornamental tree it is of a high order. It is hardy at Boston and free from insect pests. The nut is of inferior quality, but is sometimes used for food when roasted. The outside fleshy covering is very acrid.

Foremost in acreage, value, and ease of bud propagation among American grown nuts stands the Almond, and American grown almonds are foremost in the world as regards flavor. California is the main field of production. In 1896 her product was 912,300 pounds. The almond is closely related to the peach; in fact the hard shell variety bears too close a resemblance to a peach pit to be of pomological value except as grown for pharmaceutical purposes, or the tree may be used as a stock upon which to bud peaches, as it is exempt from attacks of the borer. The Soft Shell almond has not proved a commercial success outside of California, except perhaps in parts of New Mexico, not being hardy in the North and the blossoms being injured by frost in the South. The trees are budded upon the peach in the same way as peaches are budded, and treated in much the same way, being set at about the same age and at about the same distance apart. The almond comes early into bearing, reaching full bearing age at from six to seven years. Reports of average yields vary from five to thirty pounds per tree. Harvesting is often accomplished by spreading canvas on the ground and shaking the tree. After the removal of any parts of the hulls adhering when the nut is gathered, the nuts are dried, and sometimes bleached, and are then ready for market.

Next to the almond in acreage and value among nut crops in this country stands the Persian Walnut. Its origin is in Persia,

[1] Fruit of the Leechee or Litchi (*Nephelium Litchi*) was exhibited by Charles Amory, of Boston, at the Rose and Strawberry Exhibition of the Massachusetts Horticultural Society, June 26, 1883. It was raised by Mr. Amory at Sanford, Florida. — Ed.

the home of the almond and peach. Carried to Europe by the Greeks, it was passed to the Romans, who carried it to England, where it was named walnut, signifying foreign nut, while in America it has been called English walnut, though the more appropriate appellation "Persian" walnut is becoming more common. In California alone has this nut been cultivated upon a profitable scale in America. The largest reported orchard is of 700 acres, and the crop in 1896 sold for $139,360.

The rich moist valleys of Southern California, with steady supplies of water, have claimed a monopoly of suitable environment, but by the selection of varieties whose buds start late in the spring the area of profitable planting has been increased. Most of the orchards are yet of seedlings, planted from forty to fifty feet apart. These begin profitable bearing at nine or ten years, and no one knows how long they continue so. A tree is reported from France three hundred years old, yielding now fifteen bushels at a crop. No spraying, worming, or fumigating is yet necessary, and very little pruning is done; but walnut orchards are like all others in rewarding their owners for good tillage. In the early fall all brush and litter are cleared off the ground preparatory to harvesting. We have been told of a European practice of thrashing the trees with fishing poles as not only common but extolled as a means of inducing the setting of more fruit buds. This method is not generally followed in California. Gangs are started out to pick up the nuts when they have begun to fall, usually going over the orchards four or five times at intervals of a week. The nuts, after the hulls are entirely removed (sometimes portions of the hulls remain on the falling nuts), are spread on trays for drying, being frequently stirred to prevent heating. In about three days they are ready to be marketed in the usual one-hundred-and-twenty-pound sack. Some growers kiln dry their product. Much care is necessary in curing, as nuts improperly cured soon become rancid. Sometimes sulphur fumes are resorted to for bleaching. The nuts are usually graded, and in France much inferior material is consigned to the oil mill, where a superior culinary product is obtained. There are several names that distinguish strains rather than precise types, as propagation has thus far usually been by seed. Many of these are of French origin, among which we might mention the Chaberte nut, rather small, rich in oil; the tree is not so fastidious as regards fertility

of soil as some others. The Ford, with a very soft shell, and a good keeper. The Franquette, of good size, kernel plump and choice, late in starting growth, hardy. The Gant or Bijou, shell very large, — unnecessarily so for the size of the kernel, — so called on account of the shells being used for handkerchief or jewel cases. The Kaghazi, with a very thin shell, late in budding out in spring, and an early bearer. The Mayette, the choicest of its class, bringing the highest price in the market, having large, plump kernels; late in starting out. The Mission, medium in size and thickness of shell; it has been largely planted, but is likely to be superseded on account of its early budding out, lack of simultaneous blooming of male and female flowers, and slowness in ripening up its wood in the fall. Præparturiens, very precocious and productive; rather dwarfish; its nuts possess signal advantages over the last named in every way. Santa Barbara; so thin is the shell of this variety that some damage is done in shipment; it is about ten days later in budding out than the Mission, an early and regular bearer and moderate grower; hence it may be planted closer than Mayette, Parisienne, and others.

There might be mentioned here the Chili walnut, a name applied to nuts received from South America late in winter; kernel plump, quality good, much like the kinds just named, except that very frequently the shell is in three divisions instead of the usual two of European strains.

Outside of California the Persian walnut is very rare, except along the Atlantic coast, between New Jersey and Carolina. It may be found as far north as Massachusetts. In Florida the roots are attacked by the worm that so destructively causes root knot on fruit trees there. This might be overcome by grafting on the black walnut. In the East the Persian walnut may not become a profitable orchard tree, but its stateliness, beauty, and freedom from disease and insect pests, heartily commend it as an ornamental tree, and its product will be much enjoyed at home. Disappointment has often resulted on account of the deficiency of pollen and the lack of simultaneous blooming of the pistillate and staminate flowers. A remedy for this will be found in planting together suitable varieties.

There is a native California thick shelled walnut used there for stocks upon which the Persians are grafted for the purpose of dwarfing them and hastening fruiting. The Pacific coast Black

Walnut is very precocious in Philadelphia, where an eight-foot tree bore fifty nuts, but it has no other merit. The American Black Walnut has been much gathered in the East for home cheer and sold in considerable quantities at from one to three dollars per bushel. The only reason for prizing these nuts that I can see is because of custom; they are common and keep well with little care. The kernel is so intricately incased in such a thick shell, admirably adapted on the outside to picking up grains of sand to mix automatically with the kernels, that these nuts will surely be superseded as soon as we get familiar with something better — improved hickories, for instance. Sound old trees furnish timber most highly esteemed, and many are urging the planting of black walnuts for this use. The rich dark color, which makes the wood so valuable, is not present in young trees, and some say does not develop until the tree is nearly a hundred years old. If one should wish to plant black walnuts for timber purposes he will probably get one or two year trees which may be quickly planted, perhaps with a crowbar, about nine feet apart each way, surrounding them with fast growing trees like Japan walnuts, red maples, or mulberries to prevent low branching. The pollen is said to be potent for Persian varieties.

The White Walnut or Butternut thrives in dryer and poorer soil than the black walnut, and further north. The nuts find also a place in confectionery, but are hard to separate from the shell, and the wood is not nearly so valuable for timber purposes as that of the black walnut. Both may be used as stocks upon which to graft the thin shelled Persian varieties. This fact will doubtless be appreciated in Florida, where these native species are free from the attacks of the worm that so damages the Persian walnuts by root knots.

Closely resembling the butternut in the appearance of the tree, more vigorous in growth and more luxuriant in foliage, are three varieties of eastern Asiatic walnuts, called Sieboldiana, Cordiformis, and Mandshurica. The last named is from China and Korea, and the nut so closely resembles the butternut that it needs no further mention. The Sieboldiana, from Japan, is smaller than the Madeira, though it looks not very unlike it. It has a thicker shell with a smaller kernel, of slightly inferior quality. The shell is much thinner than that of the black walnut; the meat is much more easily extracted, and the tree is handsomer. The Cordifor-

mis, also from Japan, is by far the most valuable of the three. The name is suggested by the pointed heart-shaped form of the nut. This is flat and smooth, and by a single tap the shell separates into halves, and the nut is readily extracted whole without being mixed with sand and bits of shell. The kernels are of good quality, and are already prized by confectioners. Like the Sieboldiana, the nuts are borne in clusters at the extremities of the previous season's growth. The trees bear very young; I have seen many clusters on trees three years from seed. Mr. Luther Burbank says they are more regular and abundant bearers than the Persians in California. Coming from the most northern parts of Japan, they would be expected to be hardy in most parts of this country, and this is confirmed by experiment. So eminent an authority as Mr. Burbank declares them to be "as hardy as an oak." They are rampant growers; on a tree three years from seed I have measured on the leader a growth of ten feet made that season in New Jersey. Long composite leaves of most luxuriant appearance, always free from disease, make the tree most desirable as a shade tree, while in winter the trees are so open as to admit the then cherished sunshine. I am persuaded that the Cordiformis is destined to become deservedly popular in America.

The Bulletin of the United States Department of Agriculture on Nut Culture says in regard to the Pecan, "With the area of special adaptation in the United States, considerably larger than is found for either the Persian walnut or almond, and with a susceptibility to improvement by selection, in size of nut, thinness of shell, and delicacy of flavor that are very encouraging to those who have attempted this work, the pecan is probably destined to become the leading nut of the American market. If its culture is pushed with the usual skill and energy of American enterprise there is reason to believe that it will not be many years before the pecan will become not only an abundant nut in our markets, but also an important article of export."

The widespread attention and energy addressed to pecan culture along the Mississippi river and its tributaries as far as Iowa and Ohio, and the salutary results obtained, are surely bearing out this observation and opinion. Florida and California hasten to tell of the successful prosecution of the industry within their borders, but it is the alluvial bottom lands along the rivers of

Louisiana, Texas, and Mississippi that are the headquarters of the pecan culture of the world, and seem destined to maintain this prestige. The pecan is entirely uninjured by a periodical overflow of the land, having even endured as much as three feet of water for a week. Near the Gulf, where the period of inundation is longer, the pecan succumbs.

The accounts of the amazing profits of pecan culture in these regions are enough to turn the head of Horace Greeley's weathercock and make the sage of Chappaqua's injunction run "Go South, young man." A Texas correspondent of "Farm and Ranch" writes: "If at the birth of a son one would plant only twenty acres of good land in pecan trees, and set it aside for him, that boy at twenty-one would have an income of $5,000 a year and merely the trouble of picking it up." The industry has been so long established that we depend not merely upon the prattle of some visionary, or the expectation of a theorist, but horticultural literature is replete with the testimony of men of unimpeached integrity as to what has been accomplished. W. R. Stuart said in an address before the Mississippi State Horticultural Society in 1891: "It is desired to refer to one tree of the variety known as the Stuart pecan, soft shell, which has yielded this year over two hundred and fifty dollars' worth of nuts at the price readily obtained for them." As early as 1871 reports came that the pecan crop was worth five times as much as the cotton crop in some sections that year. The statement is widely circulated that in 1880 San Antonio alone shipped 1,250,000 pounds of pecans, worth from four to six cents per pound on the wagons. Many orchards are of selected seedlings, but advocates of this are acknowledging that as their orchards come to bearing they are not nearly so sanguine as before. Root grafting, crown grafting, and annular budding are successfully practised to propagate to a certainty desirable varieties, several of which are named. The qualities most sought for are large size, thin shell, plump, full kernel of good flavor, and productive trees coming early into bearing. Seedling trees have usually come into profitable bearing when about ten or twelve years old, increasing for a score or more of years, and continuing proportionately long. From ten to twenty bushels are expected as an annual crop from a tree of full bearing age. A report states that a wild tree has been known to produce more than a thousand pounds in one season. Except that it

comes so frequently, and upon such good authority, I should not dare repeat the statement, that in times past, in gathering the nuts, trees have been cut down to get the nuts quickly and at once, but such vandalism and short sightedness is too absurd to be abiding. Mr. F. A. Swinden, Brownwood, Texas, who claims the largest pecan orchard, has thought of using street sweepers to collect the nuts into rows. No especial care is exercised in curing. The small nuts are fed to pigs or consigned to an oil mill. There is trade existing for the shelled kernels; one firm alone, in 1890, sold over a hundred thousand pounds of kernels in halves; they sold for from forty-five to fifty cents per pound.

Closely allied to the pecan botanically, and closely resembling it in the appearance of the tree, is the Hickory nut, or Shellbark, — too familiar to need much description. We know of the difference in size, shape, and flavor of nut, thinness of shell, and ease of extracting the kernel. Owing to the remarkably poor success heretofore attending efforts at bud propagation, I know positively of but one grafted variety offered for sale, the Hale's. The original tree of this, probably considerably over a century old, is at Ridgewood, N.J. The nut is of good size and quality, and of exceptionally thin shell. It surely is an abiding wish with me that a large measure of the success attending the culture of the pecan in the South might be visited upon her cousin in the North, and it probably will be as attention is directed toward the industry. The tree is desirable for lawn or roadside planting; the nuts are salable, and the timber valuable.

There are several reputed hybrids between the pecan and hickory nuts, the most renowned being known as the Nussbaumer Hybrid. The original tree, standing in Illinois, is about fifty feet high; the nuts that I have seen closely resemble the pecan in appearance.

From a commercial standpoint the Chestnut for this vicinity seems to me by far the most promising of nuts. We know the tree thrives and bears here, which are important factors already established. We know that a demand already exists for the product sufficient to consume not only all American chestnuts now offered, but many thousand pounds imported in addition. Ten thousand packages come annually to the port of New York alone, chiefly from Italy and France. They are mostly sold along the streets, much as peanuts are. Consider the vast increase possible

in this line! Consider the far greater demand when they become as frequently used as desserts and relishes as their merits deserve! Mark the frequency with which the chestnut appears in newer cook books for stuffings, dressings, etc., and remember that chestnuts are even now found with vegetables upon that class of American tables that soon have innumerable imitators, and prepare for this demand, which is small indeed compared with the possible and probable consumption when chestnuts are dried, ground into flour, and become the staple article of diet that they have so long been in Southern Europe. Not only chemistry, but what is of far greater practical value, the experience of generations, has demonstrated the fitness of chestnut meal for human food.

Having noted that the tree will thrive and produce here, and that the market will absorb the product, consider some of the intermediate advantages of this crop. Chestnut trees do best on high, well-drained land, with open subsoil, — hillsides, for instance, in which New England so abounds. It is no objection that land is stony; chestnuts will not bruise in falling, as plums would. Once established, a chestnut orchard continues profitable for decades or even centuries. The famous chestnut tree on Mount Etna has been bearing annual crops for more than two thousand years and bears yet. Chestnut orchards have been likened to "a government bond: you cut off a coupon each year, while the principal is undisturbed." No protection and very little pruning are required. Peach trees must be wormed twice a year; chestnut trees never. No large fertilizer bills encroach upon profits. Chestnut roots go deep down into the earth, and pump up the fertility from far below the reach of annual crops. This kind of farming is surely a pleasant method of mining, and any one with Klondike fever may be spared privations, hardships, dangers, and exertion by having chestnut roots do his digging for him, while he is at home or about other occupations. An established chestnut orchard will yield as many bushels per acre as corn, and with little more than the expense of gathering. The Albion Chestnut Company sold the first of their crop in New York at the rate of $14 per bushel for Alpha; as the season advanced prices fell rapidly to $12 and $10, and to $7 and $8 for Numbo and Paragon. If farmers should get such prices for corn they would raise nothing else, one would think; while they have ignored a crop that would yield as much, selling for many times

the amount with much less annual expense; indeed, the annual expense is in almost direct proportion to the crop, while with corn your bill necessary to fertilize and prepare the ground, procure and plant the seed, cultivate frequently, and cut and husk the crop is about as much for a poor as for a paying crop.

Chestnuts do not require the constant attention and Sunday labor connected with dairying, and Sunday confinement has started more than one boy from the farm. They do not need to be gathered at a critical moment; a delay of a day or even of a few hours, or an untimely shower, may ruin a whole crop of cherries. If it does not suit you or is raining today, perhaps it will be better tomorrow; or if you do not wish to go out, send any one. Gathering chestnuts does not require especially skilled or expensive labor. Chestnuts are not perishable, like flowers, vegetables, or milk, neither do they necessitate expensive and quick shipments and prompt sale. They may be held in storage or shipped thousands of miles to your choice of markets. Every summer I have seen the sides of turnpikes from Philadelphia lined with tomatoes, string beans, egg plants, etc., that reached the city in times of glut or for some reason were not promptly sold and became worthless. In the case of black raspberries, for instance, the grower loses not only the cost of producing and shipping, but also the boxes. Chestnuts do not need expensive packages for shipping, nor are they bulky like hay. Mr. John R. Parry sent to Philadelphia a two-horse shelving load of tomatoes; a bag of chestnuts thrown upon the seat brought more money than all the truck on the wagon.

Many are deterred from embarking in nut culture because they think they have to wait so long for returns. As Colonel Stuart said, "My dear friend, will you not have to wait anyhow?" And are not the steady and abiding profits worth waiting for? But the fact is, you do not have long to wait. Mr. J. H. Hale wrote me, under date of Dec. 12, 1896, "We have Burbank's Early in the South grafted last spring, which made a good growth until midseason, and then was checked for a while and started on its second growth; the first growth bloomed and produced some superb nuts; we picked handfuls of them along the nursery row only a few days ago." It is no uncommon sight at Parry's nurseries in New Jersey to see fully developed chestnuts along the nursery rows on two-year grafts, and thirteen burs have been counted in

the fall on a graft set the previous spring. A six-year-old Paragon tree was literally covered with burs.

An old tree top grafted produced a bushel of nuts the second year that brought ten dollars in Philadelphia. Are there not many old seedling trees in pastures or lawns that could be thus made easily remunerative? There are large areas of land where chestnut trees have been cut for timber, and the roots have sent up suckers which may be grafted to improved varieties. The vigorous root system already established makes a fine growth, and early returns may be expected. The Albion Chestnut Company of New Jersey has begun operations of this kind with ambition ultimately to treat a thousand acres of chestnut stump land in this profitabl emanner.

Those who had no such old trees or sucker land, but who realized the promising opening in chestnut culture, have planted seedling chestnut trees of American growing, and grafted them after they have become thoroughly established. The American seedlings can be grown at home, or purchased cheaply of leading nurserymen. With proper handling they can be transplanted with as much certainty as fruit trees. The other day I walked through an orchard planted a year ago with chestnuts alternating with pears and cherries, and saw in the six-acre block but three dead chestnut trees, but more than this of cherry trees planted at the same time by the same man.

It is surprising what an influence grafting has in hastening the setting of fruit, and if this were the only advantage it would be worth the trouble. But this is not the main reason for the practice. The more attention is paid to a kind of fruit, the oftener we observe improvement in seedlings, and it is to fix and perpetuate all the improvements that bud propagation must be resorted to. The plan of planting seedling chestnut orchards vanished almost before its coming.

There are three distinct strains of chestnuts: the American, European, and Japan. The American is the tall, stately tree with which we are so familiar; the nuts are small, usually fuzzy, and of the best quality. Very few selections have been made and propagated by grafting. The European seedlings are not usually hardy here; very few imported trees live to bear, but from the seed of those that have borne here have come a very popular class of chestnuts, including Paragon, Numbo, Ridgely,

Scott, and a host of other good kinds. These trees are characterized as being intermediate between the tall American and the compact Japan; the wood is heavy, burs large, nuts good sized and of good quality. There are three kinds of chestnut in Japan, and the largest and best variety is being largely planted in America, and the choicest seedlings named and propagated by grafting. The tree is a beautiful lawn tree, of compact, symmetrical growth, not so large as the American or European; the foliage is attractive and healthy, resisting a blight that sometimes attacks the other species. The trees bear remarkably young. Luther Burbank named one of his seedlings the Eighteen Months, because it bore eighteen months from the planting of the nut. The Japans are regular and good croppers of nuts of the largest size, borne in very small burs; nuts have measured seven inches in circumference. They are not usually of the finest flavor, but the large size, attractive appearance, and earliness in season of ripening make them most profitable. They will form a perfect union when grafted on American stocks.

Of varieties now offered to the public we should choose Alpha, very early; Reliance, a heavy yielder; Kerr, remarkable for having short spines and few of them; and Parry's Giant, of the largest size. It may be that in commercial orchards some features of the traditional nutting party will be eliminated. Instead of letting the nuts fall and hide among leaves and litter, it is not uncommon to send out men with buckskin gloves to pick the burs from the tree like apples. This is done for two reasons; first to save time in hunting for the nuts, which, in rough ground with much underbrush, would be quite an item; and second, to forestall and eradicate the chestnut weevil, which sometimes proves a discouraging pest. This insect belongs to the curculio family; the adult deposits eggs in the nut as soon as it forms, and as the nut matures it incases the egg, which hatches into the familiar grub about the time the chestnut is ripe. When full grown the grub eats his way out and naturally would go into the ground to complete the cycle of his life history. In combating the insect prompt gathering cannot be too strongly emphasized, in order to prevent the development and escape of the grub, whose progeny would menace the succeeding crop.

Trees or groves in proximity to native trees whose product is left without care will be ever threatened by the weevil. Chest-

nuts, in weevil infested localities, should be dipped in hot water, subjected to a dry heat, or treated with bisulphide of carbon to kill the grub, and hastened into market.

The Chinquapin is a bush found wild in great abundance in the mountains of Virginia and Carolina. It bears a great many clusters of little burs, each containing a pretty shining little brown nut resembling a chestnut, and of superior flavor.

In conclusion let me call attention again to the timber value of nut bearing trees. I am still more anxious that their ornamental properties be remembered, and especially by the owner of a home with but limited surroundings, who feels that so much of his earnings must be sacrificed upon the altar of utility. Let him not forget that there are trees as handsome as any which will yield each year a product desirable at home or salable anywhere.

Let me commend nut culture to the farmer who would increase his income. No one need be deterred because he has no large acreage to devote to nut orchards alone. There is surely on every farm room along lanes, in pastures, or on hillsides, for a tree which, while crowding out nothing now useful, will be an enduring source of satisfaction.

Discussion.

The lecture was illustrated with specimens of nuts of many varieties, and also twigs from various sorts of nut trees.

During the lecture Jackson Dawson asked what method is used for grafting nut trees, and what proportion of the scions take.

Mr. Bartram replied that Mr. Engle would use split grafting, but he thought tongue grafting better. The proportion which takes is very misleading, sometimes from 85 to 95 per cent.

The Chairman said that there was one point about the chestnut weevil which he did not understand. If you gather the bur before the weevil hatches, does it not hatch and work in the nut after it has been gathered ?

Mr. Bartram replied that in the immature nut we find the egg of the weevil; this hatches as the nut ripens, and the weevil, after working in the nut, leaves it by making a hole in the shell, through which it escapes. If we gather the nuts early, and submit them to a hot water treatment, the weevil is killed while still in the egg.

The Chairman noted that the shagbark and chestnut were the

only nuts recommended for culture in Massachusetts. Mr. Bartram added the Japanese walnut.

The Chairman said that here in Massachusetts, where there is much useless land, we ought to grow nuts. They should be planted in orchards. Nuts and timber cannot be combined in forest growth, as the nuts will be confined to the tops of the trees. Seedling nut trees send down a tap-root very deep, which causes a good deal of difficulty in transplanting naturally grown trees. Nursery grown trees, which have been several times transplanted, do not have as long a tap-root, and can be easily handled. The speaker asked whether these trees send down a tap-root, and were thus as deep rooted as undisturbed trees.

Mr. Bartram said that they do. He had seen trees which had had their tap-root cut off for several successive seasons; they started a new one each year. Grafting is done on a piece of the root in the house, like apples, or done in the field as soon as the wood starts. The scions should be cut at this time of the year, and kept dormant by packing in sawdust in an ice house or cellar.

Rev. Calvin Terry thought that scalding would spoil chestnuts, and the flavor would be destroyed by early picking. He said that in his experience transplanted nut trees will not live. Now is the time to cut scions. He had done grafting much the same as with apple trees, but found it very difficult, and asked if there are any secret methods which we do not understand.

Mr. Bartram wished there were, and said that it is more difficult for experts to graft nuts than apples.

Joseph H. Woodford said that the nuts exhibited by Mr. Parry, of New Jersey, at the Annual Exhibition of Fruits and Vegetables of this Society last fall, were given to him. He found that one-half of them were full of worms; the good ones he sent to Kansas. Jackson Dawson has transplanted every kind of nut, and we know that nuts can be grown here. What we do want is to know how to prevent a loss of one-half of the crop after they are gathered. We must kill the insect before the eggs are laid; that is, while the tree is in blossom; success would then be sure. He asked whether there is any method of doing this.

Mr. Bartram replied that he knew of none. Hot water or dry air treatment of the nuts is the only preventive of losing the nuts after they are gathered. If you could gather up all the chestnuts in the land no new crop of insects would appear, but

this course is impossible. Native chestnuts are great breeders of this insect. Whether or not spraying will ever be applicable is a question.

The Chairman asked why the bearing of a pecan orchard of which the lecturer spoke was not satisfactory.

Mr. Bartram replied that the pecan was not satisfactory because the nuts did not all ripen up at the same time.

The Chairman asked whether that was caused by the orchard containing trees of several strains.

Mr. Bartram said that it was; it was a seedling orchard, and consequently the nuts ripened at different times and could not be gathered satisfactorily by sweeping.

The Chairman said that if they were grafted with some one variety the nuts would all ripen at the same time.

Mr. Bartram said he had recently noticed in passing through a new chestnut orchard of three hundred trees that only one per cent. had died. They were transplanted from a nursery.

Mr. Dawson had grafted all kinds of nuts, and found Hale's hickory very hard to handle. If it is easy to nurserymen, why do we not have more of them? He could not graft it successfully, but thought it the finest shellbark, if we could get it. He asked what the lecturer's experience had been with it.

Mr. Bartram said that it is one of the most stubborn nuts to graft, and hoped that we should discover some method which would succeed; until the nurserymen do we shall have to wait.

Mr. Dawson said that Mr. Fuller spoke of the stubbornness of the hickory in regard to grafting. There should be some free stock in all kinds of trees. *Carya alba* has wood that is very hard and firm. The wood of the butternut is the most free of all the nuts. If they are grown in four-inch pots and used for stocks, and the grafting done under glass, good results are obtained. There are few nuts hardy enough for commercial use. He asked why the butternut was not a commercial nut.

Mr. Bartram said that it was too hard to get at the meats, and that although it is now used in confectionery he thought we should soon have something better.

Mr. Dawson thought that butternuts improved with age, and that after two or three years from the time they were gathered the flavor was much improved. Mr. Edward S. Rand had half a dozen nuts of *Juglans Mandshurica* from Japan, from which two

trees were raised. They stand on the grounds of the Bussey Institution, and one of them has borne two bushels of good fruit. It is one of the most prolific nuts. He said that *Juglans cordiformis* and *J. Sieboldiana* are hardy here. There is a pecan at the Arnold Arboretum which is seventeen or eighteen feet high, but has never fruited; our climate will not bring them into bearing so quickly as that of New Jersey. Many other nut trees have been set out, some of them from eight to twelve years, and they are now fifteen feet high; they are just beginning to bear nuts. The Paragon chestnut is perfectly hardy here in Massachusetts. The Chinquapin is hardy and bears fruit; this might be improved and made a larger and better nut.

Robert Manning gave some account of his experiments on a small scale in nut culture. Pecan trees raised from nuts which probably grew in Texas, bought at a grocery store, proved unable to resist our winters, while trees raised from nuts grown in Princeton, Ill., had never been injured. In the same way the European chestnut, grown from nuts offered at a fair in this building, were tender, while those raised from nuts sent him by H. E. Van Deman when Chief of the Division of Pomology in the United States Department of Agriculture, which were grown at a considerable elevation, proved quite hardy. European filberts, one of whose nuts is figured in the "Report on Nut Culture in the United States," plate 13, after bearing for several years, succumbed to a fungous growth on the branches — doubtless the same as that which has destroyed many trees in Kent, the great filbert growing county of England. The outward manifestation of this fungus was in rows of small black tubercles on the branches. Plants of the native hazelnut which have fruited have thus far been entirely uninjured by this fungus. He had raised the black walnut from seed, and the trees were vigorous and hardy, but the quality of the nuts, which were what he sought, was found so inferior that the trees were cut down. A butternut tree bore nuts of excellent quality; the only drawback is that mentioned by the lecturer: the shells are so thick and hard that it is difficult to get at the kernels. All the above mentioned kinds were raised from seed. An English walnut tree, which grew large enough to bear, was killed by the severe winter of 1860–61, and later experiments had been no more successful, the trees proving tender in every instance. The speaker said he had heard that the chestnut

would not flourish near the seacoast, and asked the lecturer whether this was true.

Mr. Terry said he had never seen chestnut trees grow near the seacoast.

The Chairman could not remember any natural grown trees on the coast. He said that the Spanish chestnut was hardy, and had fruited on the grounds of O. B. Hadwen, at Worcester.

Thomas Harrison knew of a very large tree near the coast — within three or four miles; it was between ten and twenty feet in circumference.

A gentleman knew of a tree on the Hale farm in Chelsea which bore fruit.

Mr. Dawson spoke of a fungous disease on a filbert some years ago. The tree was giving good crops until the fungus came and killed it. There seems to be no cure.

Henry C. Cottle mentioned some trees on Parker Hill; there are from twenty to fifty which bear each year.

Another gentleman spoke of his experience in grafting the hickory on the pignut, as it grows in Southern Florida. The scions were cut in Connecticut, and taken South, where the grafting was done, the cleft graft being used. They grew, and some bloomed and bore nuts the second year. Those grafted on the sprouts of the shagbark were not successful. He had had no experience here in the North.

The Chairman thought that on the Treadwell farm, in Topsfield, where there have been many trees planted, a large, handsome chestnut fully a foot and a half in diameter showed the success which can be had in a cultivated tree.

Mr. Harrison asked Mr. Dawson whether there is any affinity between the filbert and the witch hazel.

Mr. Dawson said that there is no relation between them, and that they could not be grafted. He asked how soon the chestnut would bear good crops of nuts.

Mr. Bartram said in eight or ten years.

Mr. Dawson noted that in his experience the tree has to get pretty well along in years. When young only a few nuts are borne, considering the size of the trees, while on old trees nuts are borne annually.

BUSINESS MEETING.

SATURDAY, February 5, 1898.

An adjourned meeting of the Society was holden at eleven o'clock today, the President in the chair.

William C. Strong announced the decease of Edward C. R. Walker, a former Recording Secretary of the Society, and moved that a committee of three be appointed by the Chair to prepare a memorial of him. The motion was carried, and the Chair appointed as that Committee Charles H. B. Breck, Mr. Strong, and Azell C. Bowditch.

The President spoke of the desirability that the Society give more attention than hitherto to forestry and kindred interests, and after remarks by several members it was unanimously

Voted, To appoint a Special Committee on Forestry, of five members, which shall give special attention to the subject of the preservation and improvement of the woodlands of Massachusetts; shall lend its assistance, so far as possible, in securing the planting of trees, and the preservation of those already planted upon the borders of the highways of the Commonwealth; shall secure, so far as shall seem to it expedient, the enforcement of the laws of the Commonwealth relative to forests and trees; shall with the approval of the Society, petition the Legislature for such changes in and additions to the laws as shall make them more efficient; shall submit to the Committee on Lectures and Publication plans for lectures, essays, and discussions on forestry subjects; and shall have authority, with the approval of the Executive Committee, to offer prizes for written contributions to forestry knowledge, not exceeding the amount which the Society may have placed at its disposal.

The President appointed the following named persons to constitute the Committee above provided for:

SPECIAL COMMITTEE ON FORESTRY.

Harvey N. Shepard, Chairman.

Nathaniel S. Shaler,	John G. Jack,
J. D. W. French,	James H. Bowditch.

The President stated that the Annual Report of the Treasurer

had been presented to the Finance Committee, who asked for further time, which was granted.

The Secretary laid before the Society a letter from Benjamin Lincoln Robinson, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge, acknowledging his election as a Corresponding Member of the Society, and thanking the Society therefor.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

Miss Helen Sharp, of Boston.
George Abbot Morison, of Cambridge.
Charles Maynard, of North Easton.
C. S. Harrison, of Roxbury.
George Mabbett, of Plymouth.
Harvey N. Shepard, of Boston.
Nathaniel S. Shaler, of Cambridge.

The meeting was then adjourned to Saturday, March 5.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, February 12, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

The following lecture was delivered:

Some New Notions about Some Old Insects.

By M. V. Slingerland, Cornell University, Ithaca, N.Y.

For many centuries the insect world has afforded one of the most fascinating of all fields for observation by those who love to commune with Nature and to read her books. Most of those who speculate upon the various phases of that mysterious something called *life* get some of their most interesting facts from the insect world. Entomology, or the science of insects, is thus an old science and has had many devotees.

What is considered as the first entomology, or the first book devoted entirely to insects, was published in England, in 1634.

It is a quaint old volume entitled "Theatrum Insectorum." The authors, Drs. Penny and Mouffett, are said to have familiarized themselves with all that had been previously written about insects, and to have added much original matter, thus making the volume a compendium of what was known of these animals previous to the seventeenth century. Hundreds of busy minds during the succeeding two centuries found recreation in watching these interesting creatures, and their recorded observations have added much to our knowledge of the insect world. It is within the past century, however, that insects came to be studied from another point of view than that of mere love of the work or for "science's sake." It was not until about the beginning of the present century that the lives and habits of insects came to be studied with a view to discovering their most vulnerable points, that man may the more easily destroy them. In short, that phase of the study of insect life which has come to be known as economic or applied entomology is scarcely a century old.

The comparative youthfulness of this phase of entomology is not due to the fact that injurious insects were previously unknown. All are familiar with the biblical accounts of insect ravages, and many similar records are scattered through the succeeding literature. But previous to the middle of the last century most of the means used for the destruction of insects were of a spiritual nature, such as incantations, excommunications, and the like. During the latter half of the eighteenth century several books were published in Europe devoted to injurious insects, and especially to methods of combating them. Most of the recommendations, however, were mere guesswork.

In America nearly everything relating to insects has been published since the Revolution. There are many articles on such well-known insect pests as the peach borer, plum curculio, canker worms, and the Hessian fly, scattered through the early horticultural and agricultural literature. For nearly twenty years Dr. Harris published articles on injurious insects in the "New England Farmer." Finally he was induced, in 1841, to bring together the results of his wide experience and study in the form of a book, which has become a classic, and well-thumbed copies are usually to be found on the table of every American student of insect life. I refer, of course, to his "Treatise on Some of the Insects of Massachusetts Injurious to Vegetation." This simply, concisely,

yet beautifully written account of what the author had seen and learned about insects justly entitles him to be called the "Father of American Economic Entomology;" and the science of modern applied entomology may very well be said to have had its birth in America with the publication of this noteworthy volume by the State of Massachusetts.

The science has since made rapid strides in America. The earlier writings were signed by such familiar names as Harris, Fitch, and Walsh, and veritable mines of information are their reports. But the addition of Paris green and kerosene emulsion, and the modern spray pump and nozzle, to the earlier insecticidal batteries, soon revolutionized recommendations regarding the destruction of our insect foes. Thus the more recent writings of such well-known entomologists as Riley, Comstock, Cook, Lintner, Forbes, Fernald, and Howard have not only added much to our knowledge of the habits of insects, but their recommendations for combating them mark a great advance in the science, so far as it concerns the horticulturist. The establishment of experiment stations in nearly every State gave a great stimulus to the scientific study of agriculture, and in no other branch has this been more marked than in economic entomology. The working corps of many of the stations now includes a trained observer of insect life, and a great mass of literature has already resulted. But much of this material has been hastily compiled, the mistakes of earlier writers being oftentimes repeated, and is thus of little value. Good compilations, seasoned with common sense, have a legitimate place in our literature. The work has grown better each year, as the observers have become more skilful, and now there are many valuable additions to our knowledge of injurious insects coming from the press monthly in the form of experiment station bulletins. There has been too much guesswork in our recommendations for fighting insects. They are too often based upon insufficient knowledge of the life-habits of the insect, or upon the conditions under which the horticulturist must fight these little foes; and they are, therefore, either useless or impracticable. Horticulturists and others are fast realizing that in order to fight their insect foes to the best advantage it is necessary to know as much as possible about them. I usually find that those who control their insect enemies most successfully are the ones that know the most about them. Inquiries from such

horticulturists have stimulated workers in entomology to study our injurious insects with renewed vigor. The result is that the so-called "remedies" now recommended are more often based upon a more scientific and rational knowledge of the insect and of the horticultural conditions. We doubtless lead the world so far as improved methods for fighting insects are concerned. Paris green is only just coming into use in England and other foreign countries. The more progressive horticulturists now realize that the science of spraying has come to stay.

Climatic and other unknown conditions often cause a considerable variation in the habit and life of an insect. The same insect may pass through but one generation in a year in one locality, while in another State, perhaps only one or two hundred miles away, it will be double-brooded. It may lay its eggs on the fruit in one State, and on the adjacent leaves in another State. Oftentimes a very successful method of fighting an injurious insect depends upon some apparently trifling habit which may easily be overlooked. Recent additions to our knowledge of that old and familiar pest, the Codling-Moth, illustrate most of the facts above mentioned.

An entomological library which would include all that has been written about the injurious insects of the United States would occupy no inconsiderable space in any one of our great university libraries, and one would need several thousands of dollars to equip such a library. It must be remembered in this connection that much that has been recorded about our insect enemies occurs in the foreign literature. For, of the seventy-three insects of prime economic importance in the United States, the species each of which almost annually causes a loss of hundreds of thousands of dollars, only thirty are native, while thirty-seven species have been introduced, with six species of doubtful origin. Of the thirty-seven introduced species, thirty have come to us from Europe, all, with one exception, the gypsy moth, as accidental importations.

When one of our students first begins to study a certain injurious insect seriously, and fairly realizes how much has already been written about it, I am often asked: "Is it possible that there is anything new to be learned about this insect?" My experience in studying the habits of insects during the past few years has led me to believe that there is much to be learned

about some of those insects that we have thought we knew all about.

The present demand from horticulturists and others is for more detailed information, and this is resulting in the publication of many more careful and exhaustive bulletins and reports upon our injurious insects. Such bulletins are the ideal toward which most economic entomologists are striving as best they may with the facilities at hand. Whenever I make an exhaustive study of any insect, in addition to watching and recording every detail of its habits, I always find it interesting and profitable to examine what others have written about it. The discovery of the first published record of the insect, and the tracing of its subsequent history through many old and musty volumes, to discover by whom and when certain facts were added to our knowledge, has a peculiar fascination for me.

If there is any one of our common insect pests, about which we have thought that there was little new to be learned, it is the codling-moth. There was scarcely any change in our stereotyped biography of this pest for half a century or more previous to the present decade. In 1878 a practical fruit grower accidentally discovered that when he sprayed his trees with Paris green, he "not only rid the orchard of canker worms, but that the apples on the sprayed part were much less eaten by codling-moths." It was soon demonstrated by many experimenters that one could kill a large percentage of the apple-worms by applying a poison spray just after the blossoms fall. While this has been demonstrated over and over again, it will be found that the explanations as to just how the worms were killed by the poison are obscure, indefinite, and vary considerably. A horticultural friend, the late Professor Lodeman, after many careful experiments, satisfied himself that often at least seventy per cent of the apples that would otherwise be ruined by the worms could be saved by spraying. But he could not see just how it was accomplished, and often appealed to me for an explanation. I confidently expected to be able easily to find the explanation in the literature, but was surprised to discover that no definite observations had been recorded upon the habits of the newly-hatched worms; and it was only quite recently that any one had even seen the eggs of the codling-moth. I was thus forced to take up the study of this familiar pest. The results of two years' observa-

tions upon it, and a critical study of its literary history, is embodied in Bulletin 142, which has just been issued from the Cornell Experiment Station. My study brought to light, not only several interesting historical facts, but it has also resulted in some new notions about the habits of the insect.

It is said that Cato speaks of "wormy apples" in his treatise on agriculture, written nearly two hundred years before the Christian era. In the first century A.D., Pliny wrote: "The fruits themselves, independently of the tree, are very much worm-eaten in some years, the apple, pear, etc., for instance." While the apple-growers of these ancient times were doubtless familiar with the work of this worm, the real history of the insect itself apparently begins in 1635, or almost with the beginning of purely entomological literature. The first account appeared in a quaint Dutch volume by Goedaerdt. Nearly a century seems to have elapsed before we find the insect again discussed by entomologists. In 1746 a German writer, Roesel, recorded a very good account of the habits and life of the insect, accompanied by some colored pictures which have not been excelled since in color. Apparently the first English account appeared in 1747, and it was rendered especially noteworthy, since the author then gave to the insect the common name, codling-moth, by which it is today recognized by all the English-speaking peoples.

Although the codling-moth was doubtless introduced into America as early as the middle of the last century, it seems to have been first noticed in our literature in 1819. Mr. Joseph Tufts, of Charlestown, Mass., then published an account of rearing a moth, instead of the plum curculio, which had been thought to be the sole cause of wormy apples in America. Thatcher had made the same discovery when he wrote the second edition of his "American Orchardist" in 1825. This is apparently the first notice of the insect in any horticultural book, and although Europeans had been writing of it for nearly two hundred years, it is a curious fact that, so far as I can glean from the literature, it remained for this American writer to make the first suggestion for controlling the insect; he suggested scraping the trunks of the trees and applying a wash. Apparently it was not realized until 1832, when Dr. Harris called attention to the fact, that the insect which caused wormy apples in America was the same as the well-known European insect. The first American

picture of the insect seems to have been the one made by Miss Morris for the "American Agriculturist" in 1846.

The native home of the codling-moth, like that of its principal food, the apple, was doubtless southeastern Europe. It is now a cosmopolitan pest, occurring in nearly every corner of the globe where apples are cultivated. The British Columbian apple-growers seem thus far to have escaped its clutches. When once introduced into a country it spreads rapidly. What little evidence we have indicates that it spread more than half way across the United States in less than twenty-five years, reaching California in 1874. I believe that this single orchard pest not only levies, but collects each year, a tax of from two to three millions of dollars' worth of apples and pears from the fruit growers of each State where fruit is grown extensively. Beside the apple and pear, the insect sometimes attacks wild haws, quinces, plums, peaches, apricots, and cherries.

In nearly all publications, except those in the English language, this pest is now discussed as the "apple worm." While this very appropriate name is also often used by English and American writers, they usually discuss the insect under the perhaps less suggestive name of "codling-moth." It was thus named in 1747 by an English writer. As he figures a Codling tree (the name of a variety of apple tree) in connection with his account, this doubtless suggested the name. The word "codling" is doubtless a corruption of the old English word "querdlyng," meaning at first any immature or half-grown apple, but now applied to certain varieties of apples. At the present time most horticulturists and some entomologists are spelling the name "codlin." There is no etymological evidence in the latest dictionaries to support this dropping of the "g" from the old English diminutive suffix "ling." The scientific name of the insect, *Carpocapsa pomonella*, when translated is found aptly to express its characteristic habits; for the generic term comes from two Greek words meaning, "I eat greedily," and the specific name comes from the Latin word for apple.

All are familiar with the caterpillar stage of this pest, but not so many have seen the adult insect — the pretty little moth. Descriptions of the different stages of the insect are so readily accessible that it is not necessary to dwell upon this point. But there are some features peculiar to the male moths only, which you may

be interested to know about. It was long ago discovered that near the middle of the upper surface of each hind wing in the male there was a peculiar narrow pencil of rather long black hairs, slightly hidden in a furrow of the wing. While looking at the hundred or more bred specimens of the moth which we have in the Cornell University collection, I accidentally discovered that all of the males bore another much more conspicuous, yet constant and peculiar, mark. On the underside of each front wing of the males only there is a narrow, elongate, blackish spot, formed by a group of blackish scales. No one seems to have ever suspected that these spots were sexual characteristics. Thus one can usually determine the sex of a codling-moth at a glance, by the presence or absence of these black markings.

Perhaps the biography of no other insect pest has been written so often as that of the codling-moth. Begun in 1635, it was fairly well understood as early as 1746. And yet, I believe there are still many interesting things to be learned about it, before its biography can be considered as complete. About three weeks after entering the apple, it gets nearly full-grown, and makes an exit tunnel to the surface, closing the outside opening for a few days while it feeds inside. Emerging from the fruit, it usually makes its way to the trunk of the tree, where it soon spins a cocoon under the loose bark. Usually the first worms to spin up in June or July soon transform to pupæ, from which the adult insect emerges in about two weeks, and eggs are soon laid from which a second brood of worms hatch. In most of the more northern portions of the United States, only a part of the worms of the first brood pupate or transform to moths the same season, but in the central, western, and southern portions there is a complete second brood, and in some portions even a third brood of the worms annually. In the fall, all the worms spin cocoons wherever they may be, either in the orchard or in storerooms, and remain curled up in them as caterpillars until spring opens, when they transform, through the pupa, to the moth, thus completing their yearly life-cycle.

Mention of the egg or the habits of the newly-hatched worm was purposely omitted from the above brief summary of the life-story of the insect, because these are the phases of its life which are of vital importance to the horticulturist who sprays, and it is upon these that the most new light has been shed by recent inves-

tigations. The usual stereotyped statement, as taken from our leading text-book on entomology, has been: "The moth lays its eggs singly in the maturing blossom of the apple just as the petals fall. As soon as the caterpillar hatches, it burrows into the apple." Although almost every one who writes about the codling-moth glibly tells when and where the eggs are laid, it is a curious and striking fact that there is no evidence in the literature to show that any one ever saw the egg, as laid in nature, previous to 1889. The first careful observations upon the eggs, and the first picture of one, were published in 1893 in an Oregon Experiment Station Bulletin.

In the spring of 1896 I saw the egg for the first time, and was soon able to find many of them on the young fruits. They are thin, oval, scale-like objects, not quite so large as the head of a common pin. They have been aptly characterized as resembling a minute drop of milk. Instead, however, of finding the eggs where we have been taught for the past century and a half to look, that is, *in* or *on* the calyx, I have never been able to find any there, but I have seen them on the surface of the fruit *near* the calyx, in old curculio scars, near the stem, and even on the leaves of the tree. They were glued to the skin of the fruit or leaf, and being semi-transparent were not easily seen unless the apple was turned so that the light struck the eggs just right. During the past year the eggs have been found in Nebraska, "laid almost exclusively on the upper surface of the leaves adjacent to the fruit." Thus the commonly accepted notion regarding the egg-laying habits of the insect must be discarded. The eggs may be glued anywhere it happens — to the surface of the fruit, on the stem, or even on the adjacent leaves.

There has also been considerable difference of opinion as to *when* the eggs were laid. The common notion has been that they were laid about the time the blossoms fell. From the only definite evidence we have, based upon recent careful observations, one cannot escape the conclusion that, in the northern half of the United States at least, most of the eggs of the codling-moth are not laid until a week or more after the petals fall from most varieties of apples. The egg-laying period lasts for several days, and nearly a hundred eggs may be laid by a single female. Many apparently sterile eggs are laid. The egg stage usually lasts about a week.

It may be of interest to mention in this connection that I found several of these tiny eggs which had an unnatural black appearance. A few days later, instead of little apple worms hatching from them, there appeared in my cages fully developed adult insects, the surprising number of four coming from a single egg. It is wonderful to think of four perfect animals having been born in and having obtained sufficient nourishment to develop into perfect insects from the contents of such a tiny thing as the egg of the codling-moth.

The little apple worm breaks its way out of the egg near the edge, and then wanders about on the surface of the fruit until it finds the calyx, stem, or where a leaf touches. No feeding is done on the outside of the fruit, except to gnaw a minute entrance hole through the skin. More often the little worm squeezes itself through between two of the calyx-lobes and gets its first meals *in* the blossom end.

When I found that most of the worms did not hatch until about two weeks after the blossoms had fallen, I was at a loss to explain how a Paris green spray, applied according to the prescribed rule of "just after the blossoms fall," could possibly affect a worm appearing on the apple so long afterward. Fortunately I had watched the development of the young fruit, and had seen some interesting things taking place which apparently explain this mystery of how we kill the apple worm with a poison spray.

When the petals fall, the small, green calyx-lobes are widely spread out, forming an open saucer-like cavity in which the poison spray could easily be lodged. Within a week, however, these calyx-lobes begin to draw together, and, usually in two weeks after the petals fall, the lobes are drawn tightly together over the cup-shaped blossom-cavity; there is then no possible chance to get any poison into the blossom-end. Few, if any, of the worms hatch before the closing of the calyx-lobes takes place. But about eighty per cent of the young worms enter the young fruits through this calyx-cavity, and they also spend the first few days of their life in feeding in this cavity. Hence I was naturally led to theorize that the poison must lodge in the open calyx-cup, and remain there while Nature proceeds to draw a protecting roof over it. Fortunately, about the time the worms were hatching, I found some apples which had been sprayed with Paris green and

Bordeaux mixture just after the blossoms fell. I could discern with a lens minute bluish particles in the calyx-cups. About fifty of these calyx-cups were submitted to our chemist, and he soon demonstrated the presence of arsenic.

These facts lead me to believe that in applying a poisonous spray soon after the blossoms fall, we deposit some arsenic in the calyx-cavity, where Nature kindly takes care of it for us until ten days or two weeks later, when the little apple worm includes it in the menu of his first few meals. Furthermore, this poisoning of these young worms which enter the developing fruit in the spring seems to be the only way and the only time that the insect is or can be most successfully reached with the spray. Or, put in another way, we can hope to reach with a poison spray only those apple worms which enter the blossom-ends of the forming fruits in the spring. To do this, the application must be made soon after the blossoms fall, when the calyx is open. If we wait a few days, until the calyx-cavity is closed, it will be too late. I can conceive of no possible way in which a majority of the fifteen or twenty per cent of the worms which enter the fruit at some other point in the spring, and all the worms of the subsequent broods, can be effectively reached with a poison spray.

Thus, while the spraying method is very effective, it can never prove a perfect panacea, especially where there are two full broods or more of the insect in a season. However, it is a great improvement over the old banding method, for with the spray we kill the worms before they fairly begin their destructive work, thus saving the fruit they would otherwise ruin with an ugly worm-hole. If it were not for the habit of the worms of feeding in the blossom-end for a few days, it is doubtful whether spraying would be nearly so effective as it is. It is thus a remarkable fact how much of our success in fighting this pest depends upon this trifling habit of the little worms.

In short, to use the poison spray most effectively, one must understand that it is necessary to fill the blossom-end of each apple with poison within a week after the blossoms fall, for this is where the little apple worm gets its first few meals, and it is practically our only chance to kill it with a spray. Watch the developing fruit after the petals fall, and be sure to apply the poison before the calyx-lobes close, for while *the falling of the*

blossoms is the signal to begin spraying, the closing of the calyx-lobes a week or two later is the signal to stop spraying.

Another and familiar insect pest which has received considerable attention at the insectary of the Cornell Experiment Station is the Peach Borer. It is an American insect, and for more than a hundred years it has been recognized as a very serious obstacle to the growing of peaches in this country. Almost every one who has grown this luscious fruit is only too familiar with the telltale gummy mass found around the base of peach trees in which the grub-like caterpillar of this pest is at work.

The life-history and habits of the insect were fairly well known to the earlier writers. In the latitude of New York the borers begin to mature in the latter part of June, and, coming nearly to the surface of the ground, they spin about themselves a cocoon made of silk and particles of bark. The cocoon is usually at the entrance to their burrows. In this cocoon the caterpillar soon transforms to a brown pupa. Two or three weeks later this pupa pushes itself about half way out of its home, and, its skin splitting down its back, a beautiful wasp-like moth emerges. The female differs quite remarkably from the male. As they fly very swiftly during the hotter parts of the day, and frequent flowers, they thus increase their resemblance to wasps. In New York the moths begin to emerge about July 15, and most of them are out by August 1. The females soon begin to glue their small, brown, hard-shelled eggs on to the bark of the trunks of the trees. I have taken two hundred and forty-four eggs from a single female, and nearly six hundred have been found in one in New Jersey. These eggs hatch in from seven to ten days, and the caterpillars at once begin their destructive work under the bark at or below the surface of the ground. They continue to work until cold weather sets in, when they ensconce themselves in a loose, cocoon-like home near the surface of the soil, and there remain all winter without feeding. This winter habit of the borers seems to have been only recently observed. In New York the borers begin work in the spring about May 15, the time varying with the forwardness of the season. From this time on, they feed much and grow very fast. I have seen caterpillars, not over a quarter of an inch long on April 19, get their full growth and transform to the moth by July 20. Thus most of the damage is done in the spring, in May and June, when the

borer gets most of its growth. There is but one brood of borers each year, the one-fourth to one-third grown ones wintering over.

The insect is destructive only in the borer stage, and as it works beneath the surface of the ground it is difficult to get at with remedial measures. Fortunately, the peach tree heals over a wound quickly, and will thus endure and recover from the attacks of several borers or from wounds made by a knife in digging out the pest.

It is a remarkable fact that, although dozens of things have been recommended for preventing the ravages of this common pest, there is no record of any careful experiments against it. Furthermore, it will be found that when some fruit grower claims to have been successful in preventing the work of the borer by the application of a certain substance, he usually discredits the whole thing by incidentally mentioning that he regularly digs out the borers once a year. Why not give the credit to the "digging-out process" where it usually rightfully belongs?

During the past three years we have been experimenting with all of the methods we could find recommended, and have also tested what measures suggested themselves as the work progressed. Four hundred and fifty young peach trees were set rather close together especially for this experiment. Four rows of seven trees each were treated, each row with a different substance usually, and the next two rows left untreated for a check; and so on through the field, duplicating each application at some other portion of the orchard in order to give each as fair and complete a trial as possible. This extensive experiment was scientifically conducted with the utmost care, one year's work checking and furnishing ideas for the following year. All applications were made about the same time, usually during the latter part of June, and everything was done as thoroughly as possible. The following spring every tree, treated or untreated, would be carefully examined, and the number of borers removed from each noted. For three years most of the substances were tested in this thorough manner. A few old and badly infested trees near by always furnished a plentiful supply of the moths to restock our experimental orchard. Every year the four hundred and fifty trees would yield, on an average, at least one borer to each tree. As many as thirteen borers have been found in a single tree less than two inches in diameter.

Twenty-one different things were tried in this experiment, all of which were of a preventive nature except one, carbon bisulphide.

Carbon bisulphide is a very volatile, bad-smelling liquid, which is now being extensively used against the peach borer in one locality in California. Although some who have tried it admit having killed many of their trees, yet one of our correspondents writes that "they cannot get the liquid fast enough." We injected some of the liquid into the soil near several of the trees in our experiment, but we failed to kill any of the borers. It is thus very doubtful whether it will ever help us here in the East in combating the peach borer.

We found the following substances entirely ineffective in preventing the work of the borer; all were washes except one, a mechanical protector of wire gauze:

Assafœtida and Aloes.

Lime, Salt, and Sulphur Wash (extensively used in California for scale insects).

Resin Wash, two applications.

Strong Solution of Hard Soap.

Hard Soap, Carbolic Acid, and Lime (*Hale's Wash*), two applications.

Tallow. — This formed a thick, complete, and very greasy coating lasting until the next year. I cannot understand why it was not more effective. But certainly as many, and one year even more, borers got into those trees treated with tallow than into untreated trees.

Tansy, grown around the base of trees.

Whale Oil Soap, two applications.

Whitewash.

Paint made with Lime and Linseed Oil.

Wire Gauze Protector. — A mosquito wire netting placed around the base of the tree, at a distance of about an inch or more from the bark, and the top edge slit down and then drawn together tightly around the tree and tied, thus making a perfect cage around the tree, extending to the roots and for a distance of about a foot above ground. Theoretically it was a perfect mechanical protector. But in practice more borers were found in trees thus protected than on untreated trees

near by; it was from one of these protected trees that I took thirteen borers. Why the insect preferred these caged trees I cannot explain.

Six of the substances tried proved partially effective; two of these might be termed mechanical:

The old "Mounding System," practised extensively many years ago, apparently kept out about half of the borers.

Tarred Roofing Paper, carefully and tightly wound around the base and extending below the ground to the roots, seemed to protect the trees from all but about one-third of the borers. This proved next to the best preventive tested, but required much care in applying it to accomplish the required result.

White Paint (White Lead and Linseed Oil) apparently kept out from one-half to two-thirds of the insects.

White Paint and Paris Green seemed equally as effective as the white paint, but it injured the bark of the trees so much that some of them eventually died. It may not injure older trees.

Coal Tar, warmed up a little and brushed on, formed a "wash" which proved the most effective thing we tested. Only a very few borers succeeded in getting started in these trees. Coal tar has been reported as injuring or even killing peach trees, but none of our young trees seemed to show the slightest injury, even after fresh applications of the tar had been made on the same trees for three years in succession.

While, as above noted, white paint and Paris green injured the trees more or less, the following substances proved sure death to the trees:

Paris Green mixed with Glue. — This "wash" killed our young trees in about two weeks.

Raupenleim, or German Caterpillar Lime, a substance resembling axle-grease, when applied the first year did not kill the trees and it kept out the borers. But the second year every tree to which it was applied was killed.

Dendrolene, an American imitation of the Raupenleim, which has been extensively recommended and advertised, proved sure death to the trees the first season.

Thus, after three years of careful tests of all the substances which gave promise of being effective, nothing was found that would keep all the borers out and not at the same time injure the tree. Most of the "washes" recommended proved entirely useless, and others only partially effective. To be effective, a wash must have the quality of forming a good, continuous coating over the bark from the first of July until the middle of September; and it must not contain anything that will injure the tree. A wash which has to be applied more than once a year will not pay, for one can dig out the borers quicker. All the washes containing lime usually cracked and peeled off in a week or two, thus necessitating a renewal. To apply properly a wash or a mechanical preventive, one must dig the earth away down to the roots, brush the bark off clean, make the application thoroughly, and then replace the soil. It requires little, if any, more time or labor to dig out the borers than it does to make one thorough application of a wash, or to adjust the tarred paper or wire gauze protector. It is doubtful whether anything will ever be found which will not require renewal every year.

In short, a three years' careful test of all the promising methods for preventing the ravages of the peach borer has convinced us that one can dig out the borers with about as little expenditure of time and money as it will take to apply washes or mechanical contrivances thoroughly enough to keep the borers out. The "digging-out" process is certainly the surest one yet devised.

When shall we dig them out? The borers are most easily discovered in June when they are larger and their work is more conspicuous; hence one is sure to get more of the borers by digging them out at this time. Early in the spring or in the fall the borers are so small that many are often missed. As noted above in telling the life-story of the insect, the one-third or one-half grown caterpillars winter in a thin, cocoon-like home near the surface. During the winter of 1896–97 a warm spell occurred which thawed out the ground to a depth of a few inches. Several wide-awake fruit growers discovered that by simply hoeing away the gummy mass and scraping the bark a little they could remove to a safe distance many of the little borers in their winter homes.

We began this peach-borer experiment confident that some sure preventive against its entrance into the trees would be found, and

there was nothing lacking on our part to have the substances do all that they were recommended to do. Although we did not accomplish our ideal, the experiment did demonstrate what is often equally as valuable and important to know; that is, *to know what not to do.*

DISCUSSION.

J. W. Manning said that he had never found any better remedy than digging out the peach borers; he thought one could not examine the trees too often.

Joseph H. Woodford recalled the statement in regard to washing trees, and asked whether coal tar, if effective, is the most effectual preventive, and whether it kills the trees or not.

Professor Slingerland answered that they expected that it would kill the trees, but after an application on young trees for three successive years it was found that it did not. It kept out nearly all of the borers. Washes are more apt to kill trees if put on before they are established; he would wait until the trees are well started before applying.

Dr. Newhall asked whether spraying while the tree is in blossom did any injury.

Professor Slingerland replied that it did; it not only wets the pollen, but repels insects; they will not visit a wet flower. There is no doubt that you can kill bees by spraying at that time; they not only die themselves, but they take the poison home and their young are killed. The bee-keepers have tried to procure the enactment of a law forbidding spraying when the trees are in blossom. It is, however, done by men who make a contract to spray trees, and they often do it when the trees are in blossom.

Samuel Hartwell asked whether there had ever been more than one worm found in a single fruit.

Professor Slingerland had found five egg-shells on one apple, but found no worm in the apple. He said that four or five apples have been found with more than one worm, but the worms were of different ages.

Rev. Calvin Terry had found coal ashes effectual around peach trees, and thought that there was something in them that is offensive to the borers.

Professor Slingerland said that was really similar to the old mound system, with perhaps something gained from the ashes.

A. W. Cheever asked about the apple maggot.

Professor Slingerland said that it had been very thoroughly studied; it is getting southward and it is a very serious problem. It cannot be harmed with a spray. Hogs might be used to pick the apples up, or the apples could be picked to prevent its spread. Here it is called the "railroad worm."

Mr. Manning said that it has been here for fifty years.

Thomas Harrison inquired whether apple and peach borers are the same.

Professor Slingerland answered that they are very distinct. The peach-tree borer works under the bark, while the apple-tree borer works in the heart of the tree. One is a moth and the other a beetle.

BUSINESS MEETING.

SATURDAY, February 19, 1898.

A special meeting of the Massachusetts Horticultural Society was holden at half-past twelve o'clock today in accordance with the following request:

BOSTON, Mass., February 14, 1898.

HON. FRANCIS H. APPLETON, *President of the Massachusetts Horticultural Society, Boston, Mass.:*

DEAR SIR: The undersigned, members of the Society, respectfully petition that a meeting be called at as early a date as is practicable, to consider and determine what action the Society will take in the matters of acquiring land for a new building, of erecting a building thereon, of providing funds for such land and building, of disposing of the land and building now owned by the Society, and of managing and disposing of any real estate which the Society has acquired, or may acquire, from the estate of the late Francis B. Hayes; and to transact such other business as may legally come before the meeting.

WILLIAM C. STRONG,	CHARLES E. RICHARDSON,
CHARLES H. B. BRECK,	HENRY S. ADAMS,
CHARLES H. BRECK,	GEORGE F. PEIRCE,
JOS. H. WOODFORD,	ARCHIBALD SMITH,
ROBERT MANNING,	JAMES H. BOWDITCH,
MARY C. HEWETT,	CHARLES W. PARKER.

In compliance with this request, agreeably to Section XII of the Constitution and By-Laws, the following notice was sent to every member of the Society:

MASSACHUSETTS HORTICULTURAL SOCIETY.

BOSTON, February 14, 1898.

Pursuant to the provisions of the Constitution and By-Laws, at the request of twelve members of the Society, the President hereby calls a special meeting of the Society, to be held at Horticultural Hall, 101 Tremont street, Boston, on Saturday, the nineteenth day of February, 1898, at half-past twelve o'clock in the afternoon, to consider and determine what action the Society will take in the matters of acquiring land for a new building, of erecting a building thereon, of providing funds for such land and building, of disposing of the land and building now owned by the Society, and of managing and disposing of any real estate which the Society has acquired, or may acquire, from the estate of the late Francis B. Hayes; and to transact such other business as may legally come before the meeting.

FRANCIS H. APPLETON,
President Massachusetts Horticultural Society.

ROBERT MANNING,
Secretary.

At this meeting the President was in the chair. The call for the meeting was read by the Secretary.

Joseph B. Warner, Esq., counsel for the Society, was introduced by the President, and read the following vote:

Voted, That the Finance Committee, as now or hereafter constituted, is hereby authorized to sell, mortgage, lease, or otherwise dispose of the whole or any part of any property which has been, or hereafter may be, conveyed to this Society by the Trustees under an Indenture of Trust made by Francis B. Hayes and dated June 12, 1889, or be in any way acquired by the Society under said Indenture of Trust, or under the will of said Hayes; and is further authorized, for and in behalf of this Society and in its name or otherwise, and with or without its corporate seal, to make, execute, acknowledge, and deliver, or authorize to be made, executed, acknowledged, and delivered, all deeds, contracts,

or obligations which may be necessary or convenient in effecting such sale, lease, mortgage, or other disposition, including obligations for the repayment of any money borrowed on such mortgage.

The above vote was unanimously carried in the affirmative.

The President then read the following vote:

Voted, That it is expedient for this Society to move from its present building to a new one to be built for its use, and that it is desirable to procure land in the city of Boston for such new building, provided it can be obtained at a satisfactory price.

On motion of O. B. Hadwen, it was voted that when the vote should be taken it be by ballot, and that each member write his name on his ballot.

On motion of J. D. W. French, it was voted that the members be restricted to five-minute speeches.

After a full discussion of the subject the President requested J. D. W. French, James H. Bowditch, Benjamin C. Clark, and William C. Strong to collect and count the ballots.

The President reported the whole number of ballots to be 170, viz.:

Yes	65
No	105

and the vote was defeated.

The meeting was then dissolved.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 19, 1898.

A meeting for Lecture and Discussion was holden at eleven o'clock today, Vice-President Benjamin P. Ware presiding.

The following lecture was delivered:

RAMBLING NOTES ON TREES IN THE STREETS AND ELSEWHERE.

By WILLIAM R. SMITH, Superintendent of the Botanic Garden, Washington, D.C.

"Jock, when ye hae naething else to do, ye may be aye sticking in a tree; it will be growing, Jock, when ye're sleeping," is the advice which Sir Walter Scott put into the mouth of

the dying Laird of Dumbiedikes to his son, and which was actually delivered in these very words by a Highland laird when on his death-bed, to his son. This guid advisement might be followed in most of our States and Territories with the most beneficial results.

"Trees are indeed the glory, the beauty, and the delight of nature. The man who loves not trees, to look at them, to lie under them, to climb up them (once more a schoolboy), would make no bones of murdering Mrs. Jeffs."

"Every man of landed property, that lies fairly out of arm's length of a town, whether free or copyhold, be its rental above or below forty shillings a year, should be a planter. Even an old bachelor, who has no right to become the father of a child, is not only free, but in duty bound to plant a tree. Unless his organ of philoprogenitiveness be small indeed, as he looks at the young, tender plants in his own nursery-garden, his heart will yearn toward them with all the longing and instinctive fondness of a father. As he beholds them putting forth the tender buds of hope he will be careful to preserve them from all blight, he will 'teach the young idea how to shoot,' and, according to their different natures, he will send them to different places to complete their education, according as they are ultimately intended for the church, the bar, or the navy. The old gentleman will be surprised to see how soon his young plants have grown as tall as himself, even though he should be an extraordinary member of the Six Feet Club. An oak sapling, of some five or six springs, shall measure with him on his stocking-soles, and a larch, considerably younger, laugh to shake its pink cones far over his wig. But they are all dutiful children, never go stravaiging from home after youthful follies, and standing together in beautiful bands, and in majestic masses, they will not suffer the noonday sun to smite their father's head, nor the winds of heaven to 'visit his face too roughly.'"

These extracts are from the "Rhapsody" of Christopher North, in "Blackwood's Magazine," April, 1828. This essay was first brought to my notice by a distinguished son of the Commonwealth of Massachusetts, an idealistic lover of trees, Hon. Charles Sumner. His eloquent appeal in the United States Senate to the improvers of the Capitol grounds to spare the splendid specimen of *Carpinus Betulus* growing about a stone's

throw from the Senate chamber is memorable. Alas! his warning was in vain, for the tree is now dead. Its successor, planted by his friend John A. Bingham twenty-five years ago in the Botanic Garden, is a rather handsome specimen. Voltaire was a great lover of this tree. If when you visited his home at Ferney you did not admire the hornbeam hedges and trees you were not invited back. It is much used for hedges and wind-breaks in France and Germany.

I am very much in favor of memorial tree planting in public parks. In the Botanic Garden at Washington we have fifty trees thus made more interesting. Senator Hoar's fine plant of *Cedrus Libani* is of interest to Massachusetts people, and its companion, planted by Senator Evarts, is doing nearly as well.

As to whether the Archbishop of Damascus is correct or not in his assumption that Solomon planted this species with his own hands in the quincunx manner, as they now stand in the valley of Mount Lebanon, we will not venture an opinion. Lamartine, who visited these trees in 1832, very properly says, "They are the most renowned natural monuments in the universe." Religion, poetry, and history have all equally celebrated them. In Washington they have flourished forty years without injury. At Claremont and Sion House, in the neighborhood of London, there are Cedars of Lebanon over one hundred years old, and eighty feet in height. At Hopton House, near Edinburgh, and at Beaufort Castle, in the highlands of Scotland, there are trees over one hundred years old. At the latter place it is said the tree rises with all that boldness of outline and permanence of aspect which render it the glory of Lebanon and the boast of Palestine. It is to be hoped that this tree will be more planted in the future. It is especially adapted to cemeteries.

We saw, when last in Edinburgh, one hundred thousand young trees of this kind in the nurseries there. Will my enthusiastic friend Mr. Jackson Dawson inform us what he saw of *Cedrus Libani* and its varieties when there last year?

As to trees in the streets, there are two sides to the subject. There is no doubt that trees are an absolute necessity in the wide asphalt, or other paved streets in the city of Washington. But even there business streets as a rule are not treed. After the powers that be, in cities, towns, or villages, have carefully considered whether or not trees are desirable, and it has been

decided in the affirmative, we should like to make a few suggestions — not directions — gathered from an experience of over twenty years, as Chairman of the Tree Parking Commission in Washington, where we have planted over seventy thousand trees in the streets, avenues, and parkings. As failures in this matter are not only expensive, but disappointing, we would recommend that you secure the best talent available. If experience is limited see that your advisers have that with which the great painter Opie mixed his colors. "With brains, sir," was his gruff reply to the dilettante who asked him how he did it.

In Washington, where the soil is generally poor, we usually remove two or three good sized cart loads from a hole and replace with the best top soil to be had. We do this in dry weather for obvious reasons: we stir up the bottom and avoid compacting the sides of the hole. Do not plant too close. The character of the tree selected must determine the distance apart.

I hold myself chiefly responsible for a great mistake in Washington, which was corrected by my kind friend Major Twining, engineer in charge of public works in the District of Columbia, with the remark: "Smith, you have planted your trees too close, or not close enough, so as to admit the cutting out of every other one." This matter was better regulated afterward.

One important aid to success is the tree box. It is doubtful whether shading the stem of the tree from the sun, to prevent scalding, or holding the newly-planted tree steady, is its most valuable service. The straps should be carefully arranged and properly fastened. Four chestnut stakes, five feet and a half in length, are driven into the ground and well nailed to the box. A photograph of the trees and boxes, together with a map of the city, for which I am indebted to Mr. John W. Langdale, an employee of the Parking Commission, who is responsible for its accuracy in detail (and I indorse it), located the sixty-four kinds of trees in the streets, avenues, and parking in the city of Washington. The little parks and most of the reservations are under another management. This map and photographs will be left for consultation in an institution you should be thankful for and proud of — your great Horticultural Library.

Do not attempt to go into the woods or uncultivated ground for trees, except as a dire necessity. We were compelled to do this at first, for some things, and were moderately successful

with American sycamores, elms, scarlet maples, and tulip trees. They were not to be had in the nurseries at the time. By transferring them to cultivated ground in the nursery established by authority of Governor Shepard, and cutting them severely back, educating them for their duty in life, we got moderately good results; but it is my deliberate opinion that in the interest of economy it is better to get nursery-grown young trees. Every city or village or suburban town ambitious for distinction as to being well treed should have a nursery of its own, where healthy trees can be reared. Get clean seedlings from some reliable source; cultivate, prune, and train them in the way they should grow, in the best ground attainable. This last suggestion is of great importance. Trees from a poor, thin, gravelly soil, or from a wet, sour, undrained one, are worthless.

That queen of American trees, the sugar maple, is useless from such a source. This lovely tree, when barkbound from any cause, should be dispensed with, and a young healthy one substituted. It refuses to do duty as a curbstone tree in Washington. Like an Arab steed hitched to a dray, when planted with pavement to the right of it, pavement to the left of it, and a curbstone barricade in front of it, it rebels. How can it, under such circumstances, develop that beauty for which it is so famous? Vermont avenue and H street, west of the War Department, were planted with this tree, but it is anything but a success. A beautiful avenue of sixty sugar maples, brought as small trees from the mountains of Kentucky and planted from the mansion to the spring of Francis P. Blair, General Jackson's great friend and my earliest friend in Washington (his place being known as Silver Spring), flourished grandly for twenty-five or thirty years. Then all at once they lost heart and died; just why I am unable to say. A Norway maple I planted as substitute for one killed by accident still thrives. There are some good specimens in the Smithsonian grounds, not far from the monument to Mr. Downing, in well-drained naturally good ground, planted there under his direction.

The two we planted in the filled-up ground in the Botanic Garden also lost heart and died; while a black-sugar adjoining them is one of the handsomest trees in the garden. They were planted thirty years ago. The Norway maple is one of the best curbstone trees, less self-asserting than some others, but selected

for Sixteenth street, which leads from the President's mansion to the north District line, a distance of six miles. This avenue is one hundred and sixty feet wide, and two miles of it is finished. For the parking, it was my privilege to present the beautiful Liriodendron or Tulip trees, with which it is planted, to the city. This street is, we believe, to be called Executive avenue. If the trees are well cared for it will make the handsomest avenue in Washington. The tulip tree is not, in my opinion, a good curb-stone tree.

But permit me to introduce one which I think is among the best as a curb tree, *Salisburia adiantifolia*, the Ginkgo of the Japanese, or Maiden Hair tree of the botanists. Two of these interesting trees have flourished in Washington for sixty years or more, apart, however, and being unisexual no seed was produced. We were two years rooting a hardwood cutting and have a good tree thus propagated. Mr. Jardine, a Frenchman, an importer of trees and shrubs, sold to the British Legation two ginkgos to plant one each side of the *porte cochère*. He charged seven dollars and fifty cents apiece for them. The bill was disputed, and we were made referee. The matter was compromised at five dollars each. Shortly after, when searching for street trees, I visited Hoopes Brothers & Thomas, West Chester, Pa. Walking through the nursery with my friend Josiah Hoopes, we came to a large block of ginkgos. "There," he says, "you know that's a good thing, but our agents won't touch it. It won't sell." "What will you take for it?" I asked. "I'll take forty cents apiece just to get rid of it," was his reply. We bargained for three hundred. Pierce street is now planted with them; also another short street, Seventeenth and a half, just west of Lafayette square, where they are not so fine as on Pierce street, owing to their being robbed by adjoining elms in the square, and the soil being not so good. On Pierce street may be seen the effects of planting too close; nevertheless, they are very fine, and fruit freely. I have never seen an insect near them. This tree has a very interesting Boston history, which we find in Hooker's "Journal of Botany and Kew Garden Miscellany," Vol. 2, 1850, p. 318, under the heading, "The Ginkgo Tree on Boston Common." A ginkgo tree formerly stood in a garden belonging to Mr. Greene, which garden was in the centre of Boston. After his death (1832) the house and grounds were sold. This tree was

removed at the partial cost of the city (each of Mr. Greene's children paying a hundred dollars towards the expense) to the mall encircling the Common, and planted before the windows of Mrs. Greene's house, in which she resided after her husband's death. The tree is a native of China, and was of full size when Mr. Greene, Sr., purchased the garden in 1798. It is now in fine leaf and beauty. The accompanying lines by Dr. Bigelow appeared in the public papers some months after the tree's removal. This poem consists of fifteen stanzas. We quote the last:

> "And so thou hast survived thy fall,
> And fairly disappointed all
> Who thought to see thee down;
> And better days are stored for thee —
> Long shalt thou live, triumphant tree,
> And spread thy foliage broad and free,
> A credit to the town."

Is this individual tree still triumphant? If not, how long did it live? Mr. Downing, three years afterwards, wrote with approval of the operation of transplanting it. He gave its height as forty feet and its circumference as three feet. How is it now? A full history would be interesting.[1]

I have never been in favor of expending large sums of money for moving trees, even to satisfy public demand. I have looked in vain for permanent success in this matter. It usually takes a young healthy tree about the same time to grow up as it does a large one to die, after being removed. The experience of the Chicago people, years ago, with their high-priced, half-dead trees, is an example. Around the National Capitol, with great care and skill, under the direction of Mr. Olmsted, liberal sums were expended to lower and remove large trees of various kinds in considerable number. But none are left to tell the tale of their tribulations, with the exception of a few of the smaller ones, notably a European walnut, twenty feet high, twelve inches at the ground line; first raised in a pot from seed grown in Wash-

[1] The ginkgo tree above mentioned is now four and a half feet in circumference at five feet above the ground, which has apparently been filled in round it, as no part of the swell of the roots is visible. As nearly as can be judged by the eye it is about sixty feet high. The limbs still show where they were shortened when the tree was transplanted. The lower limbs have made little growth, which is doubtless partly due to other trees standing near, but near the top it has made strong, vigorous shoots. It stands in the inner row on the Beacon-street mall, opposite No. 33 Beacon street. — Ed.

ington and twice transplanted in the Botanic Garden, owing to the change of grade. It was removed to the south side of the Capitol, east, where it is a fine tree, bearing abundantly. Such valuable seeds, however, are usually secured by the small boy, much to my chagrin. I think hardier trees might be obtained by planting the seeds. It is to be regretted that the Middle States do not take this matter up. We should not send money abroad for walnuts. California does not, but freight from there is expensive. Some *Quercus macrocarpa* and *Q. palustris*, about the same size, were also moved. They have thoroughly recovered and are goodly trees.

Much more might be written on this subject, but it is enough if I get you to observe and think before spending money on transplanting large trees.

The Western Rock Elm, *Ulmus racemosa*, is a tree worthy of more attention than it has received. A dozen or more trees as curbstone trees, mixed with the other elms, are not attacked by an insect, as far as my observation goes. The two in the Botanic Garden, never. Professor Sargent, in "The Garden" (London, Aug. 10, 1878), writes of this tree as being valuable for making agricultural implements; its wood as being susceptible of a high polish, fitted for a hard finish; and its heating power nearly equal to that of hickory. It is a good street tree (nurserymen, make a note of this).

The Wahoo Elm, *Ulmus alata*, is another species not attacked by insects. The first living specimen Professor Gray ever saw was the tree I dug up in Richmond before the war. It is now a large tree, never injured by the weather. It is worthy of trial much farther north. There are fifty of these trees in the streets and parks of our city, too bitter, I think, for even hungry insects.

I have only to mention the majestic American Elm and say, "Give it room, it must have room." To say more in New England would be supererogation. Another remark we might make is that it bears the knife when young, but not the saw in after-time. Only dire necessity should be the excuse.

The Eastern Plane, *Platanus orientalis*, in Washington, is one of the best all-around street trees. The first planted in the District, as far as I can learn, was the one that we now call Thaddeus Stevens's Memorial Tree. At his suggestion two stalwart contrabands planted it in the Botanic Garden, on the

bank of the Tiber, the arching of which caused its removal to Lincoln square, where it stands a gem, occupying the centre, with its branches on the ground, shading its stem in a natural manner.

Frederick Law Olmsted, a man endeared to every lover of trees and landscape art, has used this tree with fine effect on the east side of the Peace Monument. We planted the occidental species on the west side of the same circle. Mr. Olmsted has also, after the manner of the ancient Romans, who were great admirers of this tree, planted the two western approaches to the Capitol with it. They are beginning to bear seed, and will soon be disseminated over the whole country, and thus the question where they will thrive will be tested. Evelyn's "Sylva" has some interesting stories about this tree.

Senators Hansbrough and Kyle are, with some success, trying them in the land of the Dakotas.

We have several streets planted with the Occidental Plane, *Platanus occidentalis*. They are greatly improved when severely trimmed; even the hollow-stemmed old specimens on Pennsylvania avenue, when so treated, were greatly renovated in appearance.

Another tree not troubled with insects is the Three-thorned Acacia, *Gleditschia triacanthos*. It bears pruning and is improved by it. We raise most of the trees from the variety *inermis*, but they come spiny, — not so many, however, as from the thorny type.

The Sweet Gum, *Liquidambar styraciflua*, Alexander Hamilton's American emblematic tree, is only a moderate success on the curbstone. Insects attack it. On the lawn it is better.

I have doubts about the genus Quercus as curbstone trees. As lawn trees, or in lines in the parking, they are grand. Pennsylvania avenue, east of the Capitol, is planted in the middle with *Quercus palustris*. They are doing well. It is to be regretted that it was not made uniform, as suggested by our dear departed friend Mr. Stiles, who saw, approved, and admired the two rows, half a mile long, of this oak, and said, "How grand it would be if continued to the Capitol!" See "Garden and Forest," 1894, for his notes on this subject. *Quercus rubra*, on Twelfth street, will be a grand double row in the near future, planted four feet from the curb in a continuous strip of parking.

Massachusetts avenue, four miles long, is planted with four rows of American Lindens, *Tilia Americana*: they are doing well.

It is not a perfect tree, but much better than the European Linden, which is apt to be destroyed by the borer.

The same may be said of the ash, especially the European species, *Fraxinus excelsa.* This is a very variable species, but none of the forms escape this terrible enemy. The American species he is not quite so successful in disfiguring and destroying. In the Botanic Garden there is a fine specimen of *Fraxinus Americana,* which has braved the storms of at least sixty winters or more. A cyclone broke it up about six years ago, necessitating its being headed back. It is now an ideal tree in summer; in winter not quite so idealistic. *Fraxinus pubescens* and *F. quadrangularis* are worthy of trial where there is good soil.

In a dainty little rare volume, with the author's autograph as a token of lifelong friendship to your humble servant, styled "The American Handbook of Ornamental Trees," by Thomas Meehan, Gardener, 1853, I find the following, under *Acer dasycarpum:* "One of the finest of our native trees. It is so often seen in a half-starved, stunted state, as a street tree, that one might be incredulous of its beauty, when under proper circumstances, from a mere description." One would think the talented editor and honored professor had recently visited the city of Washington. His description suits the actuality there at the present time. The clamor against tree trimming has nearly ruined the twenty-three thousand we have planted as curb trees in Washington. The limited supply of moisture and food obtainable in that position renders it necessary that this large growing tree should be judiciously pruned. It is not an idealistic theory, it is a condition that confronts us in this case. With roots caged and confined it is not possible for it to sustain a large top. Intelligence should take this whole situation into consideration and act accordingly. The habits and habitat of the trees should receive careful consideration.

Acer rubrum, the Red, or Swamp Maple. The latter name indicates the position for which it is best suited. Not being able to obtain this tree in the nurseries, we went to the woods. with but moderate success. Had we cut the small trees to the ground, when planting them in the nursery, I think we should have done better. Its gorgeous autumnal tints make it an object of great interest to every lover of trees.

Acer negundo, the Ash-Leaved Maple. This early herald of spring, with its beautiful green foliage and its rapid growth, would be an excellent street tree were it not for the bag-worm and web-caterpillar being so fond of it. In this respect it rivals the native cherries. If adopted, be vigilant to remove the bag-worms during the winter months, and watch carefully for the web-caterpillar in early summer. It should be skilfully pruned to keep it in good health.

Acer Pseudo-Platanus, or Sycamore Maple. With mountain tree we have had only moderate success. It gets covered with seeds, indicating its arrival at maturity, — a desirable condition in fruit orchards, but not in a street tree. (See Dr. Lindley's "Theory of Horticulture" on this subject.) There are many good specimens in Washington. A variety with the leaves a fine purple underneath comes true from seed, and is a striking object in the Capitol grounds when its leaves are moved by the wind.

Some fine specimens of *Acer campestre*, "the Turn-table Maple of the Romans," branching to the ground, forming handsome pyramids, planted there under the direction of Mr. Olmsted, have been tomahawked lately, agreeably to an uninstructed, semi-popular request.

Acer campestre Austriacum grows more freely, and is altogether a larger, different appearing tree, and may, when more abundant, make a street tree. It has not the dwarf habit of the species.

Æsculus Hippocastanum, the Horse Chestnut. We achieved satisfactory results with this tree on both Thirteenth and De Salles streets, owing to the opportunity afforded by the heavy filling required there. In poor soil, with no chance to root deep, by the last of summer it is not beautiful to look upon.

Permit me here to name a few probationers for the office of street decoration, and as sanitary cooling agents: *Phellodendron Amurense;* this, I think, would fill both offices. *Zelkova crenata*, *Z. acuminata*, *Celtis occidentalis*, American nettle tree, and *C. crassifolia*, the hackberry. These we would call necessity trees. Birds get the fruit in hard weather, and for this reason we recommend them to be planted largely in parks and other public places.

Catalpa Kæmpferi, of Japan. Railroad ties have been cut from this tree grown on the farm of Hon. Edwin H. Funston,

Iola, Kan., from seed furnished him by us in 1885. It is of more upright habit than the American species, and is, I think, a probable street tree in some sections. It is much used in wood engraving in Japan.

Ostrya Virginica (American Hop Hornbeam or Lever-wood) would make a nice small, but rather slow-growing street tree. It could be trimmed to a pyramid of dainty, enduring proportions.

Kœlreuteria paniculata, a small tree, much used by Mr. Olmsted in the Capitol grounds, is beautiful in leaf and flower, and its seed pod is interesting. Its habit makes it a doubtful candidate for street decoration.

I make bold to recommend that much abused tree, *Ailanthus glandulosa*, for certain streets. I quote from memory, from Mr. Linch, Curator of the Oxford Botanic Gardens. He says in an English paper: "There are twenty thousand of these trees in the streets of Paris." The objection to its bad odor when in flower can be overcome by cutting it back every two or three years. You will then get a rich tropical foliage and a low tree. I doubt whether it can be cured of its bad habit of suckering. It might help the matter to raise them from seed. Ex-Mayor Wallach informed me that there was a law against planting them in the District of Columbia, so none were planted.

Cedrela Sinensis flourishes in the city of Washington, but, like its near relative, the Ailanthus, it has the habit of throwing up shoots from the roots. Its usefulness has yet to be determined.

Populus angulata, the Carolina Poplar. We purchased one plant from the most scientific nurseryman of his age in the United States, W. D. Brackenridge, and planted it with others on the towpath of the canal on Third street, now a part of the Botanic Garden, where the original tree still lives; it is thirty-five years old, and not an ornament, but of interest as being the parent of eighty thousand trees planted and disseminated as cuttings. The talented botanist of the Agricultural Department, Professor Coville, illustrated the closeness of his observations by informing me as a curious fact that the *Populus angulata* were all male trees, and that the Necklace Poplar, *P. monilifera*, — an inferior tree mixed with them, — were females. We explained the matter by informing him they were all propagated from two trees procured from Brackenridge. Another tree from the same source, *Populus Græca*, first found near a village called Athens,

in the State of Illinois, is a good tree for narrow streets. Unlike its kindred pyramidal species, the Lombardy and Bolleana, it is not attacked by the borer, as far as my observation goes. It and the two trees first named, unless carefully pruned, become top-heavy, keep dropping their leaves all summer, and soon become dangerous to life and property. I regret to say hundreds of trees are in this condition at the present time in the city of Washington. For various reasons their trimming has been neglected.

The family to which they belong, *Salicaceæ*, affect damp, swampy, ague-breeding places, and in various ways are candidates for the high honors of quinine, as a cure for intermittent fever. As a preventive, if the five hundred acres of swamp land with which the city of Washington is surrounded, south and east, were planted with poplars and willows, their sanitary value would be immense. And then the charcoal, for making gunpowder, from the willows, might be an economic item in the future. Again, the more they are filled upon the faster they grow. My kind friend, the late Mr. Peter Henderson, in "Harper's Monthly Magazine," July, 1888, has some judicious remarks on this subject. The list of trees in that article, and the list on the map of Capt. W. F. Rossell, is a list of trees existing — not those selected by the Commission.

Professor Sargent, in "Garden and Forest," Jan. 17, 1894, criticised the list of trees recommended by various individuals for planting in Brooklyn. I agree with the learned professor in his remarks in nearly every particular. Those seeking light on this subject should read that article. It is especially instructive as to the trees not to be used in street planting.

It may interest you to know that the Camphor tree, *Laurus camphora*, is being planted as a street tree in New Orleans. A tree in a four-inch pot presented to the beautiful niece of Mr. R. Maitre, the distinguished horticulturist of New Orleans, in 1883, is now thirty-five feet high and fifty-two inches in circumference at the butt. From this tree we have received a liberal supply of seed each year.

President Jefferson's favorite tree was the Willow Oak, his enthusiasm for which is graphically described by his biographer, R. S. Raynor. Unless well supplied with food grows slowly. A few are planted on the street in front of the Treasury building. We would recommend that groves of it be planted in the various

parks or public places throughout the country, by his admirers, each individual planting a tree; none to be allowed to plant one, however, who has not reached his high intellectual plane of love for trees. A magnificent specimen stands as a sentinel near the monument of that intellectual aristocrat and truly great and good man, Professor Henry. It is seventy feet high, and eleven feet in circumference six inches from the ground.

By cutting back severely, carefully watering when necessary, and cultivating with the assiduity which a good farmer uses towards his corn crop, we reached a phenomenal success in the early days of tree planting in Washington.

Do not let dudeism drive from your street trees the white-washer. If he uses lime, blue or other colored clay, sulphur, lampblack, salt, or other material, he will greatly improve your trees and add to the health of the neighborhood — perhaps killing the much dreaded microbes of diseases. Scale insects, fungi, and lichens it will destroy. But it will not stop horses from gnawing the bark; woven wire must be used for that. For bad boys who injure trees, and for gas leaks, it is difficult to suggest remedies. I can only say mend the latter and try to improve the former.

Arbor Day and Memorial Tree Planting should go hand in hand, creating a sentiment of love and veneration for trees.

Gentlemen: After I had accepted the kind invitation of your excellent Committee to appear before you I was astonished at my self-assurance in undertaking to address the most ancient, most successful, most honored horticultural society on the continent of North America. My tribulations are now over. I thank you for the privilege and for your kind attention.

Discussion.

Dr. Goodell thought that one very important matter not alluded to is what to do with the electric enemy.

Mr. Smith said he is so angry about it that he did not care to mention it. It is very destructive, and often kills trees.

O. B. Hadwen did not want to walk behind any one in the love for trees; he grows more as he grows older, and has in his grounds most of the trees spoken of by the lecturer. He said that he has a tulip tree which is eighty feet high, elms that are nine feet in circumference, and some black walnut furniture

made from trees which he had himself planted. His love is not only for conifers, but for deciduous trees as well. He asked whether the Ginkgo of Japan and the Ginkgo of China are the same. He thought that trees here in New England want high feeding.

Mr. Smith said that the Ginkgo of China and Japan are the same.

Thomas Harrison questioned what should be done with electric corporations. He thought that they should be obliged to put an insulator on trees to which wires are attached. As it is now, as soon as the covering to the wire is worn off by rubbing against the tree, the tree is set on fire.

Rev. C. S. Harrison believed in Arbor Day, and was interested in planting trees in treeless places. He spoke of one town which was planned so as to have the tall, quick-growing trees in the centre, and the slower-growing at the outside, with the view of forming a pyramid of green as seen from a distance. This was very well in the plan, but when carried out the people used the trees for hitching posts, and the horses ate off the bark, resulting in a loss of so many trees that the design was not successful. In the West, the Box-Elder, *Negundo aceroides*, has been discarded; it does not grow to any height, and is a harbor for many insects which come into the houses and deface the carpets, as they leave a red spot wherever crushed. He would advise the use of one tree only for a street.

Jacob W. Manning spoke of the value of *Celtis occidentalis*, the Nettle Tree or Hackberry, as a shade tree; it is perfectly hardy for the West and from Canada to Mexico. The largest tree he knows of is in West Springfield; it has a spread of seventy feet, and is six feet in diameter at the base. He said the Cottonwood, *Populus monilifera*, grows to a gigantic size, with a trunk from six to seven feet in diameter. There are great trees in the north — one near Downing's place at Newburg on the Hudson. He had noticed the Red Oak in Washington, and thought that fine effects have already been obtained with it.

Vice-President Ware noted that tree-planting had been suggested for bachelors. They can propagate trees.

Thomas C. Thurlow thought people often planted trees too thickly, and advised that great care should be taken not to plant too closely around houses, and especially on the street and

directly in front of the house. Sunshine is as necessary as shade, and it is as great a mistake to shut out all sunshine from our dwellings as it is to have no trees at all. He recommended people to procure competent advice before planting trees on our home grounds, or in the streets, etc., and thought we should use our native trees rather than send to foreign countries to get what are often not nearly as desirable.

Dr. Goodell asked how close to plant trees on streets. He suggested that not over one tree to a fifty-foot lot would be about right.

Mr. Smith said that these matters should be regulated by the law. He advised using one kind of tree to each street, and would avoid planting too thickly. Lindens should be planted about fifty feet apart, and elms at least sixty feet.

Mr. Manning thought that elms vary so much in size that they need various distances; some want more than one hundred feet. He suggested at least forty or fifty feet as necessary for street trees.

Mr. Smith said that in New Jersey avenue, in Washington, the trees are as large again in one place as in another. Everything should be considered and regulated by careful study. Plant wider apart in good soil than in poor.

Thomas Harrison inquired whether any fixed rules about pruning could be given.

Mr. Smith replied that the pruning required varies with each tree.

Mr. Hadwen noted that in Washington they had taken out two or three loads of poor material and replaced this with good soil. This, he said, is very important; the foliage and rate of growth are very different in good soil. The older he grows the more he doubts the value of putting trees in the sidewalk. He would plant them at least four or five feet within his own ground; they are then under his supervision.

G. L. Thorne, of Buffalo, N.Y., said that he had planted a good many trees — more than any of the Commissions in Buffalo have — and had found that common sense must be used. Some kinds do not grow well, so one must vary the distances, and also vary the distances with the condition of the land. Get a good tree, he said, to start with; here he has spent a good deal of money and finds that it pays. He suggested that two rows of

trees be planted where possible; then if something happens to one tree the other row will have one to take its place. Plant elms fifty feet apart. Soft maples planted in wet land, if well taken care of, are very satisfactory.

Daniel Sullivan said that if Paris and Washington had made good conditions for tree planting he did not see why we could not.

Mr. Manning replied that we could; but he had seen in Reading two trees planted, one at one end of the town in a gravelly region, where the gravel had been removed and replaced by good loam and the other in naturally good soil; the latter is now in the better condition, showing that, although preparation is made, the results will not be as good as where the soil is naturally good.

Jackson Dawson said that in order to get good trees you must have good holes; if you would have fine trees then first give the tree something to eat. He spoke of the remarks which have recently appeared in the papers about thinning out trees, and compared this work with the killing of trees by electricity, about which people say nothing. If we are going to plant trees we must have laws which will protect the trees. For street trees, he said, the Norway maple is good for short streets. The soft maple is too easily broken to be desirable. The liquidambar would probably be excellent. The tulip tree is brittle. The oaks are the coming trees for this climate. The black walnut is good, but sheds its leaves early. The chestnut is also good, particularly when in flower; it is, however, a dirty tree.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 26, 1898.

A meeting for Lecture and Discussion was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

The following lecture was read by James Sturgis Pray, Secretary of the Columbine Association:

THE NATIONAL FLOWER MOVEMENT.

By FREDERICK LEROY SARGENT, President of the Columbine Association, Cambridge.

Mr. President and Ladies and Gentlemen:

During the fortunate years of peace that have thus far blessed the second century of our national independence, we have seen

develop throughout the United States a popular movement which is surely unique in the history of the world. This is the movement to bring about the adoption of a national flower. Here is a matter of pure sentiment seeking legislative recognition; a question of taste, if you will, leading to widespread organized efforts, to the formation of national societies, and to the calling of a national convention. Among the many interesting manifestations of American feeling which have characterized the close of the nineteenth century surely this unprecedented outcome is not the least worthy of our attention.

The desire for a national flower — now so widely felt among the best people of our country — springs mainly from two sentiments which all of us would cherish. These are the love of our native flowers and the love of our native land. To confirm the feeling that these sentiments are closely akin we need hardly be reminded that the floral emblems of other nations have played an important part in their history. For us a fitting national flower would bring to the service of patriotism an emblem whereby our love for the fatherland would find expression through one of its fairest products. If our people shall ever come to enjoy the benefits of such an emblem surely every true American must rejoice.

It cannot be claimed that the efforts which have been made to this end have always been wise. In fact, as we shall see, they have often been of the sort which adds to the griefs of the judicious. Nevertheless we cannot fail to find much that is helpful to the general movement in every earnest effort to be of service in this matter, and the helpfulness will be quite apart from the apparent achievement. However mistaken or ill-directed we may choose to consider the efforts which are opposed to our own, we may be sure they have all something to teach us and not a little for us to admire.

So far as I have been able to learn, the first candidate to be publicly suggested for our floral emblem was the mayflower, or trailing arbutus (*Epigæa repens*). The idea, I believe, came originally from a lady in Pennsylvania, Miss Margaret B. Harvey, who made it the theme of a poem, which she wrote while living near the site of General Washington's camp at Valley Forge. This poem was entitled "The National Flower, or Valley Forge Arbutus," and was published in March, 1887. Other poems inspired

by the charming qualities of this modest little flower have appeared from time to time.

The principal reasons which have been advanced for adopting it as our national floral emblem are these: It was one of the first blossoms seen by the Pilgrims at Plymouth after landing from the "Mayflower," and by Washington's army after their winter at Valley Forge. Its flowers suggest five-pointed stars, and its leaves are laurel-like. It grows wild in the thirteen original States, and displays an independence of spirit by defying cultivation.

Unfortunately, these alleged qualifications depend, for the most part, upon features that should entirely disqualify any candidate. Thus, its early blooming, which with us makes it a flower of April rather than of May, renders the blossoms unavailable for decoration on any national holiday — that is to say, when we should most wish to use them. Moreover, not only is the plant unknown in the wild state over three-quarters of our territory, but to those of our fellow Americans who dwell in that vast region it must remain unknown even in cultivation.

These facts are perhaps sufficient to show that the trailing arbutus is quite undesirable for our national flower, no matter what historical associations it may possess. But these very associations are most unfortunate. For this flower has been recognized for several generations as the floral emblem of Nova Scotia. As such it has appeared on coins and postage stamps of that province; it has been used in important ways in their historical celebrations; and on certain flags widely used by the Nova Scotians it occurs as a device accompanied by the motto, "We bloom amid the snows." The Nova Scotians are certainly to be congratulated upon having a floral emblem so admirably fitted for their purposes. With regard to those Americans who have wished us to take this emblem for our own it is but charitable to suppose that they have done so largely in ignorance of Nova Scotia's claim. We know that many who at first wished us to have the mayflower have now abandoned the idea. As to those who still cling to it, let us hope that their ideal of patriotism and national honor is not, as it would seem to be, disregardful of the commandment, "Thou shalt not steal," or of that which says, "Thou shalt not covet . . . anything that is thy neighbor's."

In many ways a more happy suggestion was that of the goldenrod (Solidago). I am informed by Miss Harvey that this idea

was published first in the Boston "Globe," in May, 1888. The fact that golden-rod grows wild in such profusion almost everywhere in the United States, and is such a brilliant adornment of the roadside, made it at once a very popular candidate. Its generous wealth and aspiring air of freedom soon found appropriate expression in verse. To some the composite nature of its ample clusters exemplified our motto, "*E pluribus unum.*" To others the golden color of the blossom seemed a fitting symbol of the gold standard which they upheld during our recent presidential campaign.

In 1889 a booklet, containing chromolithographs of the golden-rod and the mayflower, was issued by Messrs. L. Prang & Co., with a view to testing public opinion on the national flower question. Copies of the booklet were sent to a number of prominent persons, with the request that they tell what flower they would prefer for the floral emblem of the nation. Of the replies received, a large majority were in favor of the golden-rod. Not long after, a canvass of votes among school children, chiefly in New York State, showed a similar preference for the same flower. It was doubtless because of the enthusiasm then shown that the New York "Recorder" in 1895 issued a colored picture of a bunch of golden-rod, tied with a red, white, and blue ribbon, and labelled "The National Favorite."

For a while it looked as if all this enthusiasm would carry the day for the golden-rod. But a growing dissatisfaction was yet to be reckoned with — a dissatisfaction which continually increased among those who first welcomed the golden-rod as a candidate.

Such a revulsion was sure to come as soon as the golden-rod advocates attempted to use their flower for decorative or other purposes. They could not decorate with it on Memorial Day or on the Fourth of July, because it does not reach its prime until August or September. Even when it was in bloom they found it unsuited for indoor use. Its color, upon which they so much depended, was found to be dingy and unattractive when away from the strong light of the sun.

Its use indoors, moreover, met with vigorous protest in the interest of health, for physicians maintain that the emanations of this plant frequently produce asthma and are an exciting cause of hay fever or autumnal catarrh. Farmers either despise it as the "yaller weed," or hate it because of its dark record of injury to cattle, while, according to a recent announcement, the State Veter-

inarian of Wisconsin considers it to be the cause of a disease resembling consumption which has been killing thousands of horses.

The efforts to use representations of the golden-rod for decorative purposes have been scarcely more successful than the attempts to use the flower itself. When it has been impossible for the artist to indicate the color (as must often be the case in decorative design) he has felt it necessary to add a label conveying the information, "This is a golden-rod."

While practical considerations turned many people against the idea of making the golden-rod a national emblem, many others, with whom sentiment was paramount, soon came to see that arrogant aggression, cheap display, the false liberty which is unmindful of the rights of others, were characteristics which would make this plant a deplorable symbol for the American people.

As the Columbian celebrations approached the desire for a national flower grew apace and stimulated the efforts of many people in various parts of the country to bring about the adoption of some fitting floral representative. The most noteworthy of these attempts were in connection with the pansy (*Viola tricolor*) and the Indian corn (*Zea Mays*).

In comparison with the golden-rod the pansy, as will be seen, has the decided advantages of variety of color and simplicity and distinctiveness of form, combined with entire harmlessness. But on the other hand it lacks the necessary qualification of being a native flower, and is entirely without associations that would connect it with our country rather than with any other.

The suggestion of this flower, and the organization of the Pansy Society of America, is to be attributed, I believe, to Mr. Albert C. Hopkins, of Nashua, Ia. What has been published regarding the society would indicate that its efforts were chiefly among children in schools. At this distance from the scene of its activities it is difficult to form any just idea of the extent of its influence. It must be said, however, that its power, in 1892, was sufficient to induce the Hon. Walt H. Butler, Representative from Iowa, to introduce into Congress two bills embodying the views of the society. The first of these provides, in Section I, "That on and after the first day of May, A.D. 1893, the official and recognized floral emblem of the United States of America shall be the flower commonly known as the pansy; named also garden violet, hearts-ease, and so forth." Section II requires, "That the

national sentiment expressed in connection with this emblem shall be justice, liberty, union, culture, and peace; and that the last three words — union, culture, and peace — shall constitute the motto;" and Section III, "That the inauguration of this emblem shall be duly and fittingly celebrated on the first day of May, A.D. 1893, in connection with the opening of the World's Columbian Exposition." The other bill is intended "to make more definite, uniform, and symbolic the flag of the United States." The main provisions of this bill are first, that the union or blue field of the flag "shall hold the outline of a white pansy with a true pansy centre, which shall represent the capitol or central government; that the white stars, representing the States, shall be set inside the white outline of the pansy in a manner to produce the general effect at a distance of a white pansy in a blue sky." The second and last section provides, "that the staff of the flag shall be made to represent a sleeping American rattlesnake, head downward, with an acorn in place of the head, and a white pansy bud in place of rattles, the whole symbolizing defence, courage, wisdom, strength, peace, and immortality."

Lest you should think me taking liberties with your credulity, let me hasten to assure you that I am quoting verbatim the essential features of these bills. Imagine for a moment an acorn-headed pansy-tailed rattlesnake stiffened into a flagstaff, and bearing aloft as the banner of our country this travesty of the stars and stripes, proclaiming to the world an alien flower as Columbia's emblem! Surely when this extraordinary combination was conceived western wit was wool gathering. It is perhaps needless to say that this attempt to manufacture sentiment by act of Congress did not meet with popular approval.

In the advocacy of Indian Corn a hearty American feeling expressed itself in terms of genuine culture. One of the first notes to be sounded in its praise was a stirring poem by Edna Dean Proctor, entitled "Columbia's Emblem," which appeared in the "Century Magazine" for September, 1892. In 1893 the June number of the "Arena" had a symposium of eminent persons on "Maize as the National Flower," and in the same year appeared a little volume of "Tributes in Verse and Prose," entitled "Columbia's Emblem, Indian Corn." This collection included, besides the poem already mentioned, other poetic selections appreciative of the worth and beauty of maize, extracts from American

historians showing its importance in our national development, accounts of its ceremonial use by the red men, and illustrations of attempts to use it in architectural ornament.

Since the Columbian year the fortunes of this candidate for the national flower have sadly declined. While the advocates of maize had said many interesting things about their favorite, and in a most charming way, these proved to be very little to the point. The cordial words of welcome which at first greeted their suggestion in so many quarters were soon followed by words of vigorous protest backed by fundamental objections. To these no satisfactory answer has been forthcoming, and the significant chill of silence which has followed so quickly upon the first glow of enthusiasm has been made scarcely less depressing by the occasional confessions of some more or less distinguished persons that the objections aforesaid have had no weight with them. To the credit of others, among whom are included some of the most prominent of the original advocates of maize, be it said that they have recently expressed themselves as having entirely abandoned the idea of trying to make this plant our national flower.

How shall we explain the fact that a candidate which was introduced to the public under such favorable auspices, and vouched for by such distinguished leaders of public opinion, should prove so disappointing? My answer is that those who fondly expected the public to accept Indian corn as a national flower simply reckoned without their host. In the first place, we of the people are so constituted that not even with the imaginative help of the poet can we recognize in a maize plant what we mean by a flower. Though horticulturists have developed some ornamental varieties of maize, they class them as foliage plants and not as garden flowers. If a botanist insists that it has what he calls flowers we have to remind him that in this case, then, what he calls flowers are wrapped in husks. For the purpose of decoration there might as well be no flowers at all. To us it neither has what looks like a flower nor could we without making ridiculous pretence ever manage to use the plant as a floral emblem. In the second place, it has come to our knowledge that maize is not really a native of our country.[1] While we admire many foreign plants, and are glad

[1] All recent authorities agree that maize is not indigenous outside of Central and South America. See Gray's "Field, Forest, and Garden Botany," revised by L. H. Bailey, 1895, p. 468; Harshberger, J. W., "Maize," Contr. Bot. Lab. Univ. Penn., 1893, I, 2, p. 151; DeCandolle, A., "Origin of Cultivated Plants," p. 387 *et seq.*

to profit by them in various ways, we reserve a special affection for the plants belonging peculiarly to our native land, and this affection we wish to bestow upon our floral emblem. We insist that our national flower shall belong to our national flora. A national flower which is not a flower and is not national is not the sort of a national flower that the people desire. Moreover, the adoption of this plant would not only deny us what we seek, but would force upon our minds associations antagonistic to the feelings which a national emblem is meant to inspire. This would result from the many prosaic uses of corn, which, because of their very importance, suggest our most frequent and therefore most potent thoughts regarding it. When the average man begins to realize that he is expected to be uplifted by corn-fed thoughts of country the idea is pretty sure to be greeted with a grin. Yes, the saving sanity of American humor may be trusted to keep us from mixing our patriotism with our porridge.

Before endeavoring to trace the further development of the national flower movement let us pause for a moment to review the situation presented in 1892, the Columbian year. Four noteworthy attempts had been made to satisfy the growing desire among our fellow countrymen for a floral emblem which might fitly represent the United States among the nations, and meet the requirements of national celebrations such as the one nearly at hand. Each of these attempts had failed to secure popular approval. Yet these suggestions, and the efforts directly connected with them, were the best results which the national flower movement had to show up to the time of the Columbian year.

At first sight the situation as described may not seem to have afforded a very promising outlook. Yet I believe it can be shown that, in reality, important progress had been made toward fully satisfying the desire for a worthy national flower. A few words will show what I mean.

The problem presented to our people has been an entirely new one. Other nations, it is true, have come to have their floral emblems, but each of these was, as it were, plucked in the childhood of the nation, snatched up as an unconsidered trifle by the way, and worn near the nation's heart while it braved the road of national progress; till, in later days, the little flower became a precious memento of the journey.

The same experience is not for us. Our nation was born with

the marks of age upon it. It had no childhood. Its mission was to seek in this new world the fountain of eternal youth, which has not yet been found.

There are many tokens of the road which leads to these pleasant waters, and one is a certain flower which makes the heart feel young and inspires the noblest yearnings of youth. We may not find this flower except by careful search, nor may we know it except it meet in us an answering wish. Therefore, when we hear one say, "Behold! It is the mayflower," and another, "Nay, but the golden-rod," and a third, "The pansy is the one," and yet another, "We have found it in the maize," let us be glad, for this tells us that the *search* is well begun. Let us rejoice even more to hear still others say, "None of these can be the flower; our search is not yet ended," for this gives hope that the true desire, the touchstone of success, has really come.

My parable, I hope, will interpret to you, moreover, the significance of the next stage in the progress of this extraordinary popular movement. The search for the true flower, once started, aroused in every section of the country a spirit of childlike enthusiasm which led to many supposed discoveries.

I shall not be expected, I hope, to dwell with impartial inclusiveness upon all the suggestions which issued from this Columbian frolic amid the flowers. Many of them are now forgotten, and excited but little interest at the time.

Our present purpose will be served by calling attention to a few specimens which illustrate the most significant types. As will be seen, the lessons taught by the preceding failures had not yet been learned. Certain persons who did not know or did not care that their candidates were the chosen emblems of other nations proposed that we should adopt the rose of England, the clover, recognized as the shamrock of Ireland, the chrysanthemum of Japan, or the lily, which has been so prominently associated with the history of France. Others who still thought, apparently, that our people might be induced to adopt a foreign flower not native to this country, advocated the pink, the pampas plume, and the cosmos. Of the last mentioned candidate one of the newspapers remarked: "Its only claim to nationality is that it was introduced into this country a few years ago from Mexico, by a German florist of Hoboken." The lingering fondness for a weed, even though a foreign one, expressed itself in the proposal to choose

the ox-eye daisy, or whiteweed, which figured as the symbol of the silverites in the late presidential campaign. The poetic feeling that a floral emblem should somehow be good to eat found further expression in the suggestions to glorify the peanut and the potato, while a somewhat similar sentiment urged the grateful recognition of those comfort-bringing foreigners, King Cotton and Señor Tobacco.

To many good people it has seemed that the whole matter depended merely upon personal fondness, and, therefore, as a contribution to the question, they have told the public their favorite flower, it never occurring to them that fitness for national uses should be the first consideration.

Perhaps the most extraordinary suggestion of the time was that we have instead of a national flower a bouquet or garland composed of State flowers. There were those who welcomed the idea as a beautiful compromise, calculated to please everybody. But alas! the more people thought about it the less they liked the idea. It was asked, Supposing every State to have adopted its floral emblem, how could any one ever get together the forty-five flowers, in bloom at different times? If by some wizard's spell such an incongruous medley could be collected, what could be done with it, or how could it be represented in a small space? To this question no satisfactory reply has been made. But for the comfort of those who still see useful possibilities in the idea it should be pointed out that so far as the garland could be used at all it might supplement, but could never be a substitute for, a national flower.

None of these candidates aroused more than a fleeting interest. The pond lily, the larkspur, and our native asters and sunflowers, were somewhat more favored. Asters and sunflowers won support from their wide dispersion and stellar or solar suggestion; but soon two fatal objections appeared. The first was their late blooming; the second, that their blossoms so nearly resembled those of the chrysanthemum of Japan that if used for national purposes in conventional design they would be indistinguishable from that foreign emblem, which to some we might even appear to be copying.

The larkspur was urged because of the red, white, and blue flowers of different sorts, but since there was little else to recommend it, and as in the wild state it was not very widely known, it was but little urged.

The pond lily at first recommended itself strongly by its exquisite form and fragrance and by its time of blooming; but its chances for national favor were nipped in the bud when people came to realize that its petals closed tightly in cloudy weather and at sundown, and that the famous lotus of the Egyptians (virtually their national flower) was a water lily closely similar to our own. It was in vain that one of its advocates pointed out the excellent example which the water lily set to the American people, by going so early to bed.

No little interest was aroused by the suggestions of those who sought to reinforce the growing interest in park-gardening, and the celebration of Arbor Day, by leading the popular desire for a national flower in the direction of some tree or shrub. The oak, the American elm, the magnolia, the tulip tree, the yucca, and the mountain laurel were the principal woody plants brought forward. There was not a little to be said in favor of some tree emblem, especially since Canada afforded us an encouraging example in having adopted the sugar maple. Nevertheless, although the recommendations came from high quarters, there proved to be insurmountable difficulties in the way of a wide popular acceptance of any such idea. Very few of our woody plants grow wild over the greater part of our territory. Nearly all belong to the East or the West, or grow well only in the Northern or the Southern States. The magnolia, the tulip tree, the yucca, and the mountain laurel, for example, are thus restricted in their distribution; the few trees like oaks, pines, and elms which have a wider range are unsuitable for the purposes of a floral emblem because they have no flowers possessing a decorative value. A further difficulty is that the cultivation of any tree or shrub would be scarcely possible to large numbers of our people, who derive, however, much pleasure from raising herbaceous plants. Thus it happened that another group of disappointments came to swell the list already recorded.

Surely nothing could better show the invincible vitality of the popular desire for a national flower than its persistence in spite of all these deferments of hope. Those who thought that the movement had at last exhausted itself in more or less ridiculous futility were entirely mistaken. They might point by way of confirmation to the fact that interest in such matters was being largely directed to the choice of State flowers. But this interesting outcome of the national flower movement, instead of supplanting the original

desire, in reality strengthened it, and at the same time afforded most helpful encouragement.

The problems connected with choosing a suitable State flower are much the same as those involved in a fitting choice for the Union. The main difference lies in the lesser difficulties which go with the smaller territory. It is but natural, therefore, that satisfactory solutions of the State problem should be first attained. Among the flowers which have already been adopted by legislative action as the floral emblems of their representative States the following may be mentioned: The moccasin flower, or lady's slipper, (*Cypripedium*) was chosen by the Minnesota Legislature in a resolution passed shortly before the opening of the Columbian Fair. The next year a bill was introduced into the Legislature of Montana naming the bitter root (*Lewisia rediviva*) for State flower. This bill was passed in 1895. The Columbine (doubtless *Aquilegia cærulea*) has been for some years the recognized floral emblem of Colorado. The matter is being more or less vigorously agitated in many of the other States.

In this work good service is being rendered by the National Floral Emblem Society of America through various local societies which are affiliated within it. The organization was begun at the time of the World's Fair in Chicago, and the headquarters are in that city. As expressed in its Constitution, the aim of the Society is to "obtain a genuine expression of the will of the people" which shall lead to the adoption of a national floral emblem and the selection of State flowers, so far as these have not already been chosen. It purposes through a somewhat elaborate system of appointments and committees to reach every part of the country. One of the best examples of a local branch is the Floral Emblem Society of Massachusetts. This branch, under the able presidency of Mrs. Ellen A. Richardson, has for the past few years been affording opportunity for the advocates of various flowers to present their claims at its meetings. It has also striven to win for us a more rational and edifying celebration of the Fourth of July, and has devoted itself to various other patriotic and educational concerns.

Entirely independent, although in friendly relations with the Floral Emblem Society, is the Columbine Association, which today holds a leading place in the national flower movement. The fortunes of the Columbine Association since its beginning in 1895 have been so closely linked with the progress of the general move-

ment that the history of the one is largely the history of the other. Yet what the Association is accomplishing has come through the concentration of its efforts upon the single aim "to bring about the final adoption of the Columbine as the national flower of the United States."

To trace the development of the columbine idea from its beginning we must go back to the Columbian year, when the search for a national flower was being pursued with keenest interest in view of the approaching celebrations. When every one's thoughts were so largely occupied with matters Columbian it was most natural that the columbine should occur to some of us as being a flower especially appropriate for Columbia's emblem. Once in mind, the idea was found to possess remarkable possibilities which have been unfolding ever since. It is significant that the idea came to several different persons quite independently, at about the same time. In the West, as we learn from recent information, this candidate was suggested by M. Sears Brooks in the Madison "Courier," of Madison, Ind., for Aug. 1, 1891. The principal arguments there advanced in its favor are as follows: "Whenever a flower has been adopted by any country it has been because of some symbolic meaning. Not merely that it was beautiful, but that in some way it represented some historic event or exhibited some characteristic quality. We have such a flower in the wild columbine. First, because it wears our national colors, red, white, and blue. Growing in every section of our country, its color at the South is more often blue; at the North it is white, while in this locality it is red with a golden interior, typical, it would seem, of the blood and treasure expended to secure the Ohio valley to an English-speaking people. The name 'Columbine' is derived from the same Latin word as is the name of Columbus, the discoverer, and of Columbia, which our nation rightly bears.

"Botanically, the wild columbine belongs to the genus *Aquilegia*, whose name is derived from the Latin *Aquila*, or the eagle, ever regarded as the emblem of dignity and might, and adopted as our national emblem. From these facts we see established a symbolic claim for the wild columbine to which no other flower can pretend.

"In its typical character we see that it grows and thrives under the most adverse circumstances. It dances just as gayly upon the bare rock, with no visible sustenance save sun and air, as in the

highly cultivated garden, its only change under culture being a multiplicity of trumpets, one within another, to sound the praises of a free and glorious country. It has all the delicate beauty and power of endurance belonging to American womanhood; all the courage and hardihood of America's noble sons. Even in decay there is no shabbiness; the trumpet-shaped petals fall singly, one by one, beautiful to the last, leaving the central shaft which they protected fruitful with seed for coming generations.

"Graceful in poise, under no circumstances becoming a noxious weed, wearing an air of prosperity as it swings its tiny bells from the crevices of bare rocks, what more can be said of any flower as the emblem of American Independence and Thrift?"

In the East the first public announcement of the idea, so far as I am aware, was by Isabella Carter Rhoades in a poem which appeared Jan. 16, 1893, in the Springfield "Republican," under the title "The Columbine for Columbia." The words of the poem were written to go with our national air, "Columbia, the Gem of the Ocean." They are as follows:

"Emblazoned in panoply regal,
The rose and the lily may shine;
Aquilegia, akin to our eagle,
We claim thee, O wild columbine!
Through Commonwealths five and twice twenty
And States yet in embryo, too,
Scatter widely thy symbols of plenty,
Cornucopias red, white, and blue!

"Thou art red as the East flushed with glory,
Deep blue as the warm Southern skies,
Snowy white as the North's hilltops hoary,
In the West, like its own golden prize.
Ring airily out on the mountain,
Swing slowly thy bells on the plain,
By prairie and cañon and fountain
Elfin fingers wake Liberty's strain!

"Be our lives like thy leaflets well rounded,
Holding truth as their hearts hold the dew;
May our Union, for Liberty founded,
Nurture Justice and Purity too.
O country with future so glowing,
The nations still watch thee afar!
Portion wisely the plenty o'erflowing
From the horns that encircle the star!"

In the "Home Magazine" for March of the same year T. T. Swinburne is quoted by a writer on "The National Flower" as advocating the columbine for reasons similar to those suggested by its earlier champions. By a curious coincidence there appeared at the same time in the "Household" an article by the present writer, entitled "Our National Flower," in which substantially the same arguments, along with others, were set forth.

Finally Harlan H. Ballard, the President of the Agassiz Association, without being aware that the columbine had already been suggested for our national flower, wrote in the "Journal of Education" for April 2, 1896, as follows: "Let us leave the roses white and red with passion to wither on the dusty pages of England's history, but let us adorn Columbia's brow with the columbine, that breathes of dove-like peace."

The conviction that the columbine was the flower of flowers for Columbia's emblem came also quite independently to other persons who made no public announcement, and we shall not be surprised to learn that other original expressions of the same idea have been made in public, besides the five at present known to us. That the same idea should have come to so many at about the same time is an interesting proof of its inevitableness in view of our allegiance to Columbia. The desire to have the columbine as our national flower may be said, therefore, from its origin at this time, to have been a direct outcome of our Columbian anniversary.

The rapidity with which the columbine idea won adherents seemed to confirm the hope that the magic flower, so long sought, had at last been really found. But many another flower had seemed for a while to be the true one, and the task of testing the columbine's qualifications had only begun. But so strong was our faith in the columbine that a few of us, its early advocates, felt impelled to undertake this task.

Our method of procedure was to bring to the attention of leading Americans, representing many diverse walks of life, the main arguments for our candidate, and to ask for their opinion regarding its fitness as viewed in the light of their special experiences. For opinions as to the columbine's horticultural possibilities we went to horticulturists; for proof of its artistic fitness, to authorities on decorative design. And so with the other aspects in which a candidate for the national flower should show itself well qualified. A

few examples will show the character of the encouragement received at that time.

Surely no one could speak with higher authority regarding the horticultural merits of the Columbine than the late Francis Parkman, for three years the honored President of this society. It seems especially appropriate that I now for the first time take advantage of his permission to publish in full the following letter:

50 CHESTNUT STREET, March 25, 1893.

MR. FREDERIC LEROY SARGENT:

DEAR SIR: I have read your interesting paper in the "Household" which is by far the best I have seen in relation to our national flower. Some of your suggestions are very striking and you have won me over to your belief that the columbine is the best choice we can make. I have always been partial to it on its own merits and have raised many hundred seedlings from its different varieties.

It is within the reach of the most modest purse, as it is best raised like the pansy from seed.

Some of the hybrids of *Aquilegia chrysantha*, *A. cærulea*, etc., are of remarkable variety and beauty and do not require any artificial process of fertilization, as when planted side by side they mutually fertilize themselves.

For my part, in spite of one or two brilliant exceptions, I think that the American long-spurred varieties are by far the best of the genus.

Yours very truly,

(Signed) F. PARKMAN.

Other communications received, and statements in seed catalogues, showed that the columbine idea was being welcomed likewise by professional horticulturists. One of the most significant instances of this practical approval came from Mr. Jacob W. Manning, who took a prominent part in the planting of the grounds at the Columbian Exposition. This gentleman having expressed himself as thoroughly in favor of the columbine for the national flower, we were moved early in 1893 at the instance of Mr. R. T. Jackson to suggest the desirability of making as full use as possible of this plant in the coming displays, if provision had not already been made to that end. We received the gratify-

ing reply that this idea had been anticipated in the plans, and that the columbine would figure conspicuously among the herbaceous plants at the World's Fair.

As evidence of the esteem in which American columbines are held among foreign floriculturists we find that George Nicholson, justly recognized as one of the foremost horticulturists of the world, says in his great "Dictionary of Gardening": "Too much praise can scarcely be lavished upon this elegant genus of plants." Moreover, it is of interest to note that of those species which he especially recommends by "starring" a majority are indigenous to our country. Sir William Hooker, than whom no botanist has ever had a wider acquaintance with the flowers of the world, said of one of our Rocky Mountain species, *Aquilegia cærulea*, "In my opinion it is not only the queen of columbines, but the most beautiful of all herbaceous plants."

In matters botanical we have depended mainly upon statements which have come from the botanists of the Harvard Herbarium. Dr. Gray's "Synoptical Flora of North America," as continued under the editorship of Dr. Robinson, recognizes thirteen species of Aquilegia indigenous in the United States. That there are just thirteen is interesting as a coincidence, in view of the thirteen stripes in our flag, commemorative of the thirteen original States. From this same work we learn that the territory throughout which these native columbines range embraces every State in the Union except perhaps those which border on the lower Mississippi. This remarkably wide distribution is indeed almost without parallel among our native plants, if we except certain weeds.

FIG. 1. — Side view of Rocky Mountain Columbine and a single petal detached.

Figures 1–3 will serve to recall the main types of general form assumed by our native columbines. Figure 1 shows the general form in such species as *Aquilegia brevistyla* and *A. saximontana*, both of the Rocky Mountains, and so closely similar to the common columbine of the gardens (*Aquilegia vulgaris*) that when first discovered they were

deemed by botanists to be merely varieties of that Old World species. Dr. Gray recognizes five American species of this type; and the latest works inform us that the *A. vulgaris* itself is now frequently found growing wild in the Eastern and Middle States.

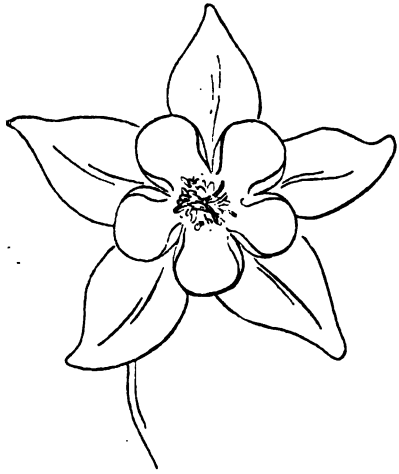

Fig. 2. — Front view of Rocky Mountain Columbine.

It was to this short-spurred type that the names Columbine and Aquilegia were originally applied. The latest dictionaries confirm the view that columbine comes from the Latin *columba*, dove, and was given to the flower because of its resemblance to a group of doves. The same authorities state that Aquilegia is from the Latin *aquila*, an eagle, most probably because when the flower is reversed the curved nectaries suggest the five talons of an eagle's claw. Of straight-spurred forms we have seven species, as follows: the small, red-flowered *Aquilegia Canadensis*, which is the one most familiar in this region; two very similar to this in the far West; another, *Aquilegia cærulea*, with blue, lilac, or white flowers, often three inches broad and with spurs two inches long; and three, including *Aquilegia chrysantha* and *A. longissima*, with golden or pale yellow flowers, having nectaries like horns of plenty, ranging from one to six inches long. The flowers of all our

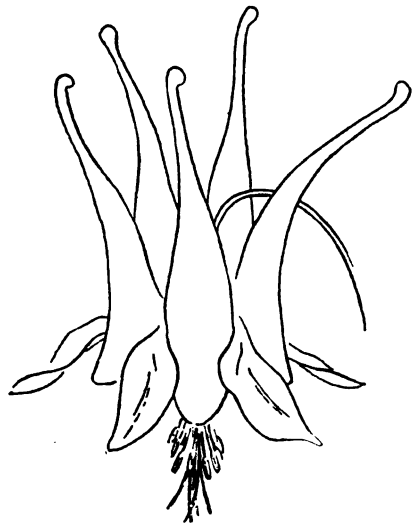

Fig. 3. — A Western American Columbine.

species present in front view the outline of a beautiful five-rayed star, immediately suggestive of the stars of our star-spangled banner. The time of flowering for the whole country is given as extending through the spring and early summer. Thus, as will be seen, columbines are available on our only national holiday, namely, the Fourth of July, which is celebrated in every State; and are at their very best on Memorial Day, when we have most use for a national flower.

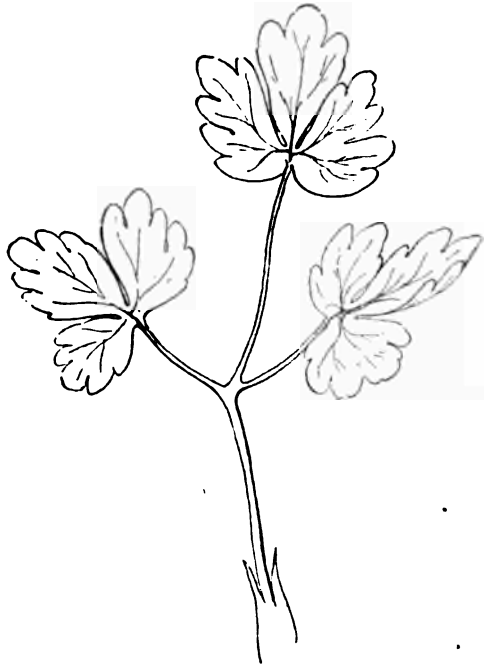

Fig. 4. — Leaf of Eastern American Columbine.

It was felt that from the point of view of decorative design the columbine must possess great advantages, from the fact that its national associations were expressed not only in its name, but in the form and colors assumed by the various parts. Accordingly, this aspect of the flower was brought to the attention of professional designers, and search was made for actual examples of its use in decoration. Only a few of the most interesting results can here be given. Mr. C. Howard Walker, lecturer on Architecture

in the Boston Museum of Fine Arts, and on the History of Ornament in the Massachusetts Institute of Technology, wrote us as follows: "The columbine is the only one of the competitive flowers which is symbolic and can be used decoratively in all its parts. I wish that the public could appreciate the advantage of the choice of a flower which frankly shows its arrangement upon a geometric scheme, and of which the parts are sufficiently simple to be clearly defined, and which also is to be found in more than one color."

We were interested in having our attention called to the fact that John Ruskin in his "Elements of Drawing" chose the leaf of the columbine as an especially happy illustration of the organic beauty which is attained through a well-ordered subordination of parts. His drawing of the plan of the leaf is significant also as showing that the terminal segment is composed typically of thirteen lobes. Thus we see that the leaf as a whole, with its many leaflets of many forms harmoniously related, would remind us of our motto, "*E pluribus unum*," while the terminal group, the leader of them all, would suggest by its subdivision the thirteen original States whose preëminence in the Union we symbolize by the thirteen stripes of our flag. See Fig. 4, Leaf of Eastern American Columbine.

An examination of designs taken from illuminated manuscripts showed us that both the leaf and the flower of the columbine have long been favorite motives with designers. In the decorative work of William Morris, that prince of modern designers, we have found repeated examples of the columbine figuring as a leading element. American designers are just beginning to realize what a treasure of decorative possibilities they have in the American forms of this flower.

American poets we found had long shown a loving appreciation of its charms. It may be safely said that no other of our native flowers has received such tender tributes of affection from so many of our foremost poets. Sometime we hope it may be possible to publish the considerable collection which has already been made. A few short examples must here suffice. Ralph Waldo Emerson says:

> "A woodland walk,
> A quest of river grapes, a mocking thrush,
> A wild rose or rock-loving columbine
> Salve my worst wounds."

In these verses of Elaine Goodale see how vividly its wild grace has been felt:

"Skirting the rocks at the forest edge
With a running flame from ledge to ledge,
Or swaying deeper in shadowy glooms,
A smoldering fire in her dusky blooms;
Bronzed and molded by wind and sun,
Maddening, gladdening every one
With gypsy beauty full and fine,—
A health to the crimson columbine!"

No one of our poets has ever helped us more fully to feel the quickening spirit of nature than Jones Very. By many of us his utterances have been treasured as among the choicest outcomes of New England culture. It becomes, therefore, of especial significance that of his collected poems five should be on the columbine. From this wealth we must make a small selection. First, as showing something of the range of thought which this flower suggests, let me quote from his sonnet written about twenty years ago, "On some Blue and Golden Columbines from Pike's Peak, Colorado":

"O new-born State, what lovely flowers are thine!
Differing in color, but in form the same,
From mountain heights has come thy columbine,
Which shares with ours in beauty and in name.

"Our youngest State may grander scenes disclose,
Far loftier mountains, parks and vales more fair;
Yet where the columbine on hillside grows,
Strange though the scene, one heritage we share."

Finally, in "The Return of the Columbine," he speaks thus of the form familiar to him from childhood around his native home in Salem:

"In every crevice thou findest a place
With beauty the rocks to adorn;
The dark, craggy hillside thou lovest to grace
With bright hues like the colors of morn.
And the children come o'er the hills to roam,
And gather in bunches thy flowers;
Sweetest tokens they are, in many a home,
Of their walks, and the glad summer hours.

"Oh, would that the beauty so lavish and free,
And that doth with each season return,
We might with the glad heart of childhood see,
And the lesson it brings for us learn!"

These lines I have quoted especially to recall to your minds the peculiar affection which American children have for columbines. It is preëminently the children's flower, as other poets have told, and as I feel sure the experience of all of us will testify. We have had men and women from every section of the country tell us that there is no other plant which has such power as the columbine to call up the happiest times of their childhood.

These assurances confirmed our belief that at last we had found the magic flower which grows by the road to the fountain of Eternal Youth, wherein is mirrored our nation's true ideal. The columbine had shown its power to make the heart feel young. If our country's name and its mission of peace, if the hallowed symbols on our flag and coat of arms, if an example of dauntless freedom beckoning from the heights of highest achievement, can move us, then will the columbine yield the inspiration which we need. By all these tokens it is Columbia's flower. The road along which it would lead us passes through the bewildering woods where wanderers are lost; yet, by the flower's guidance, we should climb up the rugged sides of the everlasting hills, until, high above obscuring forms, we stand erect on freedom's summit, and feel the continent at our feet. There we should find the columbine, our pioneer, expanding its dove-like wings above the eagle's nest.

Such was the faith, which time only strengthens, in those who founded the Columbine Association. We were a small company, yet believed that success would be given to our feeble efforts, where so many others had failed. We believed this because we no longer could doubt that an important message had come to us to proclaim, and by our love of country and our country's fairest flowers we were bidden to say it forth as best we might.

In the autumn of 1895 a preliminary organization was effected, and by the following spring the Columbine Association was fully established. Since then its affairs have been managed by a governing board consisting of three officers and a council of twenty-one members. In this council are men and women especially competent to advise in the various artistic, literary, horti-

cultural, botanical, educational, and other questions touching our special work. Among these persons are several members of the Massachusetts Horticultural Society. Although the Columbine Association came before the public less than three years ago it has already about three thousand members. These represent nearly every State in the Union. The fact of this rapid increase will, it is thought, lend interest to a brief statement of our plan of work.

Our principal publication is a leaflet stating concisely our arguments and methods. Copies of this, each accompanied by a membership application blank, have been widely circulated by the Association, at a price fixed so as just to cover cost.

Our constitution provides that "The object of the Association shall be to bring about the official adoption of the columbine as the national flower of the United States. To this end, the Association shall undertake to circulate as widely as possible information regarding the unique qualifications of the columbine for Columbia's floral emblem, and in other ways to arouse and direct the interest of our fellow-Americans in this important matter. As soon as the membership shall have become sufficiently extensive to warrant such a step Congress shall be memorialized, and a petition be presented which shall urge the formal recognition of the columbine as an emblem of the Nation."

It is further provided that "membership in the Association shall be open to all, and all shall be welcome," and that "an initiation fee of ten cents shall be required." This small fee barely covers the actual cost of the printed matter sent to the member, which includes two copies of the leaflet, each with its application blank, in order that the member may begin at once to secure new members. Up to this time the profits have been insufficient to permit any free distribution of the Association's publications. No one concerned in managing the affairs of the Association receives any remuneration for his services. All money coming into the treasury is expended entirely for the benefit of the cause.

The most effective means of spreading the glad tidings of the columbine's possibilities has been simply the passing on of the message from one person to another; from this one to a third, and so on and on. But much help has also come in other ways. Various lecturers in different parts of the country have made it their theme. Patriotic and literary societies have chosen it as a

subject of discussion. Not a few of the leading newspapers and magazines all over the country have given their approval and the help of their columns to our candidate and our work, although these same papers had seemed to be unable to take seriously the previous efforts towards securing a national flower.

The quarterly known as "Poet-Lore," the leading magazine of its class in the country, has adopted for its cover a columbine design.

The managers of several charitable fairs have found that a "Columbine Booth" proved a most remunerative novelty. At one of the great fairs given in Boston last winter arrangements were made not only for a Columbine Booth presided over by Miss Columbia, but for a representation of the golden-rod and the Indian corn at other tables. At each the visitors were invited to vote for the flower of their choice, at five cents a vote. At the close of the fair it was announced that the Columbine had received far more votes than the other candidates.

Some of the very best work has been done in the schools. Since nothing can show so well the inspiring power of the columbine idea as its possibilities in the hands of teachers I wish especially to call your attention to a few examples of what they have accomplished. Miss Ida Thayer Weeks, of the Tileston Grammar School, at Mattapan, writes as follows: "In all my experience I do not remember the children so absorbed in anything as they were in this. I talked with them a bit first as to a national flower, what it was, why we should have one, the flowers of other nations, etc., and then I read the leaflet, stopping all along to explain or discuss. The greatest proof, however, which I can give of their interest lies in the fact that when I suggested (in fear lest I should dampen their enthusiasm) that each should write a composition on the subject, not one face fell. Any teacher will understand what I mean, I feel sure. Each has illustrated his writing with pen and ink sketches, but, best of all, each has designed and painted a suitable cover for it. Crude art it is, but done with a most loving spirit." The children's columbine designs, accompanying the letter from which I have just quoted, represented the work of all the class.

To those who are familiar with children's attempts at decorative work it has been a matter of surprise, in looking at this series, that so much individuality and variety are shown. The usually

numerous examples of copying one from another are looked for almost in vain. While, of course, the same elements are used by all, they are managed in strikingly different ways. We cannot account for this except by supposing that the various forms of the flower so appealed to these children, and so invited them, that each felt at once something of the joy of independent invention, and had no need to imitate. From a flower with which unskilled children can do so much we may fairly expect a far more interesting treatment at the hands of professional designers than they have shown themselves capable of giving to the other flowers which have been advocated.

Indeed, the columbine has already formed the subject of some admirable designs besides the ones to which we have already referred. One of the most attractive of recent wall papers is composed of bunches of columbines. Many will also remember the very popular Columbine Calendar which Messrs. L. Prang & Co. produced for 1897. This proved to be so much of a success that a more elaborate one is in preparation for next year. It should be noticed in passing that with these professional designs, even when most conventionalized or lacking in color, it has not been considered necessary to affix a label.

Another way in which the columbine idea has been of help in the schools is by affording a leading feature of the school exhibitions. At the Tileston School the graduating class already mentioned presented as the principal exercise on the programme an animated discussion of the National Flower question, which had been prepared in dialogue form by their teacher. The published reports show that this feature made the occasion one of unusual interest. For the benefit of other teachers this discussion was published in the "Journal of Education" for March 25, 1897. We have heard, also, of its successful use in other schools; notably, in the Pierce Grammar School in Brookline, at the graduating exercises last June. Added interest was gained by having the other numbers on the programme chosen with reference to the general subject, namely, "National Emblems correlated with History, Literature, Music, Drawing, Latin, and French."

This work in the schools we feel to be of especial importance, since the main purpose of the Columbine Association is an educational one. But, as we have already seen, there are plenty of men and women not yet too old to welcome the message we have

to declare, if once they might realize its true meaning. The chief hindrance to many who would otherwise be friendly to our cause is that they do not see clearly just what sort of a plant would fully satisfy their desire for a national flower. We were much helped in our effort to reach these people by the opportunities offered at the National Flower Convention, held at Asheville, N.C., Oct. 21–23, 1896. This convention, called to recommend a national flower for adoption by Congress, was composed of delegates from various States of the Union, chosen by their respective governors, at the request of Governor Carr, of North Carolina. The two delegates and the two alternates from Massachusetts were, through the kind offices of the Secretary of this Society, selected from the governing board of the Columbine Association, and included its President and its Secretary and two members of its council. At the convention the President of the Columbine Association was elected to preside. To the Secretary of the convention, Mr. Edwin A. Taylor, belongs the credit of the original idea of thus bringing together officially accredited representatives of the different States, and to his self-sacrificing and untiring energy was due the final accomplishment of an undertaking unique in the history of our country. Delegates representing a majority of the Eastern and Middle States were present, and a few from the South and West, but it was found impossible at that time to secure the attendance of those from the more distant States. This was largely owing to unfortunate circumstances attending the presidential campaign. Thus the absence of many of the governors on campaign business made it impossible for them to give due attention to the appointment of delegates, and, indeed, a matter affecting so little the great political questions of the hour would naturally give place to more pressing concerns. But, in spite of the fact that a majority of the States were not represented, the deliberations of the convention advanced the national flower movement in important ways. The main result is set forth in the following official letter:

"His Excellency Elias Carr, *Governor of North Carolina:*

"Sir: We, the undersigned, have been appointed a committee by the National Flower Convention, assembled by your invitation in the city of Asheville, the 21st–23d of October, 1896, to apprise you of the results of their deliberations.

"In regard to the main object of their assembly, viz., to decide upon a flower to be recommended in a memorial to the National Congress for adoption as our national floral emblem, they have concluded, after careful consideration, that in view of the inadequate representation of the different sections of the country it is inexpedient to make any recommendation at this time.

"In the way, however, of contributing to the decision of the matter sometime in the near future they have thought it not improper to present herewith a copy of the resolution adopted by them at their first business session for their own guidance in the selection of a proper floral emblem, viz.:

"'*Resolved*, That a plant to serve properly the purposes of a national flower should meet the following conditions:

"'1. It should be a native of the United States, and should grow wild over the greater part of its area.

"'2. It should bloom on one or more of our national holidays.

"'3. It should be capable of easy cultivation in any garden.

"'4. It should not be a weed, or in any way offensive, or harmful to health.

"'5. It should bear what in the popular sense is called a flower, and should not be merely a foliage plant or one chiefly valued for its fruit.

"'6. It should lend itself readily to floral decoration by variety and purity of color and distinctiveness of form.

"'7. The features characteristic of its form should combine such simplicity and gracefulness that, when used conventionally in decorative design, the flower may be readily recognized independently of its color.

"'8. It should be a flower which has never been used by any other people as their floral emblem, and not resemble such a flower in general form.

"'9. It should possess, if possible, patriotic associations plainly connecting it with the best for which our country stands among the nations of the world.'

"While the convention deemed it inexpedient to make any recommendation of a special flower at this time it was evidently the sense of a majority of the delegates present, as shown by an informal vote, that the Columbine, or Aquilegia (sometimes known

as Wild Honeysuckle) is the only flower which meets the requirements set forth in the above resolution.

"We have the honor to be,
"Very respectfully yours,

(Signed) "FREDERICK LEROY SARGENT (Massachusetts),
"W. N. GEDDES (Pennsy vania),
"C. F. CURRIE (New Jersey),
"L. CHAILLE JAMISON (New Orleans),
"HENRY HOLZAPFEL, JR. (Maryland)."

In judging what the convention accomplished it should be borne in mind that this was the first attempt ever made formally to submit the question of a national flower to a deliberative body of representative men and women officially chosen for the purpose. The first and most important step toward a satisfactory solution was an agreement as to the qualifications which should decide the fitness of a flower to be our national emblem. The great need was a clear expression of fundamental principles upon which future discussion might profitably proceed. So fully was this need met by the resolution quoted above that we have yet to hear of any one who calls in question the entire justice of its provision. The convention, in refusing under the circumstances to go further than this and try to hasten the final decision by a recommendation to Congress, was influenced solely by the consideration that the whole country would not be fairly represented by their votes, and that therefore the true progress of the national flower movement would by such action be more retarded than advanced.

It is announced in a recent Asheville paper that arrangements are making for a second National Flower Congress, to be called by President McKinley at Washington, D.C. We await with interest further details from official sources.

As a further outcome of the Asheville Convention there has recently been started by Mr. Edwin A. Taylor an independent society known as the National Flower Council. Its headquarters are at Asheville, N.C. Some of its forms of procedure are closely similar to those which have proved so successful in the Columbine Association. A fundamental difference is in the fact that the National Flower Council claims no special interest in any one flower.

The Columbine Association has been scarcely less fortunate in the opponents it has aroused than in the friends who have rallied to the cause. There is no better test of the strength of an idea than its power to meet gainfully opposing ideas. When, as often has happened, opponents of the Columbine Association have been converted into friends their applications for membership have been none the less welcome. At the risk, therefore, of encroaching on the time allowed for after-discussion of the lecture I trust I may be permitted to state the substance of the worst objections which the advocates of the columbine have encountered. If there are present any of our friendly opponents, perhaps they may be introduced to some aspects of the matter which had not occurred to them; and if in the short time remaining at my disposal I shall be unable to answer to their satisfaction all the objections which have occurred to them I trust that opportunity will be afforded for considering their views more at length.

To facilitate our quest for truth let us imagine an attorney for the remonstrants, who shall have been entrusted with all the correspondence and newspaper clippings belonging to the association, and shall have been otherwise empowered to find out all the adverse criticisms which have come to our ears. We promise that he shall be no man of straw, but shall quote the most damaging evidence he can find.

He begins: A prominent horticulturist of this State expresses the feeling of not a few thoughtful persons when he says that to him "a floral emblem seems superfluous and not a thing to legislate into existence."

We reply: As regards the importance of our having a suitable national flower this present meeting is proof that the leading horticulturists of Massachusetts now hold an entirely different view from that expressed by the gentleman quoted. Furthermore, it shows that by inviting to this lecture other thoughtful people of the community it gives them credit for believing that some importance is to be attached to a matter which touches the public sentiment of this and of future generations, and must affect the opinion which foreign nations are forming of the good taste of our people. Perhaps the gentleman himself has now changed his mind. If he admits that we have reason to be glad and thankful for the beauty and significance of our flag and coat of arms, which make them admired throughout the world, then he stands

committed to the belief that future generations would be grateful to the people of today for the adoption of a floral emblem which arouses the same inspiring sentiments by the language of living beauty — a symbol of symbols, not made with hands. He will not then deem that a superfluous thing which permits our writers, artists, teachers, and our people everywhere, to remind us of our country's highest ideals in an endless variety of beautiful ways not possible by our present heraldic means. If the gentleman had lived in the early days of our country, would he have advised Congress not to legislate into existence such a thing as a flag and a coat of arms?

Our objector continues: What you ask regarding our flag and coat of arms receives an answer much to the point in an opinion expressed by a governor of one of the New England States. The American eagle and the stars and stripes for which he gallantly fought afford all the emblems he wants for patriotic purposes, and he is jealous of anything that might stand as a rival to "Old Glory" and "The Bird of Freedom." A flag is a military necessity; a coat of arms a requisite of government; a national flower is neither. As to the use of such an emblem on postage stamps and the like he prefers to have, as now, the heads of Franklin, Washington, or other great Americans, rather than any floral design.

We reply: The governor misses our intention by supposing that we expect the national flower to compete in any way with our other cherished emblems. This could never happen with us any more than it could with other nations having national flowers. The rose of England does not join in the fight of the lion and unicorn for the crown. The rose with the shamrock and the thistle modestly offsets the grimness of this animal belligerency by touches of significant beauty. Witness the use of these flowers on the jubilee stamps of Great Britain. In this interesting series of postal designs the main feature of all is, of course, very properly a portrait of the queen, while the surrounding ornamentation is much enriched by the introduction of conventional representations of one or more of the flowers mentioned. The designs of our present postage stamps would lose nothing by the addition of the columbine as a subordinate element, and they would gain both in beauty and significance. If our flag is a necessity of war the columbine as an emblem is a necessity of peace. Neither can

truly be said to be entirely indispensable, but both are invaluable as means of inspiring effort to patriotic achievement. Each is fitted to serve its special purpose better than anything else possibly could. We need the columbine for our emblem of peace. Nothing else can so fitly express Columbia's mission as the prophetess of peace, the peacemaker of the nations. No other emblem can hold so persuasively before the people that Christian ideal which prompted our great warrior to say, "Let us have peace."

Again our opponent speaks: We deny that the names of your plant upon which such stress is laid have the significance which you attach to them. Columbine means column-binder, and Aquilegia, according to Dr. Gray's latest work, is from the Latin *aquilegus*, water-drawer, the derivation from *aquila* being, as he says, "an invention."

We reply: These objections might be important if true. It was a long time before we could track that "column-binder" idea. None of the great dictionaries or the special books on plant names even so much as referred to it. They were found to be unanimously of the opinion that columbine comes from *columba* (a dove), of which *columbus* is the masculine form. Finally in an old edition of Stormonth's dictionary we found that after showing how it came through the old French form, *columba*, a dove, he adds, "may be only from *column* and *bine* from Anglo-Saxon *bindan*, Icelandic *binda*, to bind, as in 'woodbine,'" and then tells us that the plant he is talking about is *Aquilegia vulgaris*. This plant is not a vine, and no one ever knew it to bind anything unless perchance it be the hearts of those who love it. All the writers best qualified to judge of the matter evidently consider that Stormouth ought to have known better than to make such a wild self-contradictory guess. Those who have been worrying over Dr. Gray's remarks on the derivation of Aquilegia will find comfort in its correction recently published in the second fascicle of the first part of the first volume of the "Synoptical Flora." On page 463 we read: "Aquilegia. The etymology of the generic name is at best doubtful." The Columbine Association has never claimed otherwise. Our statement from the first has been simply this: "However the name may have originated, it has generally been understood by generations of those who have used it to be connected with the Latin *aquila*, an eagle." For proof of this we have the statements of innumerable writers on plants for over one hundred

and fifty years. This long-established association of ideas no one can doubt. The fact that no one really knows how the name Aquilegia came to be given to the columbine is not of the slightest consequence from our point of view. We are not concerned with the unknown beginnings of the name, but with the vital association which it has come to have and can never lose.

The objector returns to the charge: What you say about these names may be true enough, but how about the specific name, *Canadensis*, which botanists have given to our Eastern columbine? Is not this name with its Canadian significance most unfortunate? We reply: On the contrary all that is unfortunate about it is that so few of our people have ever heard the plant called by that name, and that so many of those who have heard it do not know what it really means. The history of the name is briefly this: Linnæus, the "Father of Botany," gave the plant this name in 1753, borrowing it from Cornut's "Canadensium Plantarum." In those days the region called Canada, as is well known, extended from Quebec to New Orleans. The name *Canadensis* could only mean that the plant grew in this immense region, of which by far the greater part now belongs to the United States. Not a few of the other plants which received the same specific name at that time are never found in the present Canada at all. Many of us are glad to feel that our familiar wild columbine does grow in the Canada of today, for we take it as perhaps prophetic that some day when the columbine's message shall have made Columbia's sway a wider blessing the little plant will no longer be growing on an alien soil.

The anti-columbinist continues: Among the popular names and fancies which have become associated with the columbine there is one which makes it ridiculous; it is called "folly's flower." An early American poet, William Young, speaks of "the columbine with its cap and bells for folly." Mr. Meehan quotes from Miss Twamley to the same effect, and says that even Shakespeare refers to this flower in connection with folly.

We reply: What you say may have some value as a joke, but a sense of humor must prevent any one from taking it seriously as an objection. In the first place it is not true that Shakespeare refers to this flower in connection with folly. Mr. Meehan is entirely mistaken. The two obscure writers whom you mention seem to be about the only ones whose thoughts have turned in

this direction. To them, however, we have reason to be grateful as adding one more to the quaint conceits which this flower has suggested. It has been well said that we love those persons best at whom we may now and then have our little laugh. The principle applies here. This suggestion which leads us to see the cap and bells in the columbine and so make of it a little jester affords an affectionate touch no less welcome than quaint. Our beloved Lincoln, whom Lowell calls "the first American," would have been less truly so without his jokes. So in the columbine — if there was one feature lacking to make it truly representative of all that is best in the American people it was a suggestion of the characteristic American humor. This is now given us in the reminder of the cap and bells, the badge of those invaluable representatives of freedom of speech called fools, perhaps because they were generally the wisest and wittiest men of their day.

Again the opposition speaks: Many complain that our wild columbine is too frail to be useful for decoration, and some urge furthermore that to choose it for a national flower would be to encourage its extermination.

We reply: Wild flowers are very seldom as satisfactory for floral decorations as cultivated ones; hence our need of florists and horticulturists and our gratitude for their achievements. No one who has seen the magnificent exhibitions of cultivated columbines in this hall can fail to recognize them as having all the qualifications necessary for decorative purposes. Like roses they need to be carefully handled, because of the delicacy of form which is an essential condition of their exquisite loveliness. So cared for they are durable enough — more durable than many flowers more widely used — and as durable as the loveliest flowers ever can be. If for any one who shall desire to use columbines on national holidays it shall not have been practicable to raise or to buy them the wild ones will generally be available in the vicinity, and if treated with becoming tenderness will prove a joy far more lasting than the critics would have us believe. Experience has shown that a bunch of wild columbines carefully tended will remain fresh in a vase of water for nearly a week. As to any real danger of exterminating such a plant, it is quite imaginary. For in the first place not only is the plant difficult to uproot, and in certain cases inaccessible, but the free seeding of these individuals insures a good supply of new plants. Moreover, if the columbine should

once become our national flower its rights would be more jealously guarded than ever, and more efforts would be made to sow seeds wherever they would grow. It is not the least of the services which the Columbine Association is rendering to lovers of our wild flowers that it seeks to make two columbines grow where but one grew before.

Our antagonist resumes: You say that Colorado has already adopted a columbine for its State flower. Does not this preclude its use by the country at large?

We reply: Not at all. Colorado's view of the question is well shown by the fact that Governor McIntire of that State is a member of the Columbine Association, and has written us his hearty approval of our plan. If other States should wish to adopt the columbine as an emblem they would of course need to choose some other sort sufficiently distinct from the Colorado one to avoid heraldic conflict. But between the United States and any single State there could never be any such conflict. This is illustrated by the way in which the American Eagle and the Stars and Stripes of the National shield recur again and again in the arms of the various States. Instead of a conflict of emblems the result is expressive of a further bond of union of the parts within the whole.

The counsel for the remonstrants regrets that the time occupied in answering his arguments has already been so much as to prevent him from entering several other protests that he had prepared. Rather than tax your patience further, however, he is willing to rest his case on the following general objection: The advocates of the columbine contend that their candidate is not only the most suitable flower for the purpose, but that it is the only one that can answer the requirements. How can any one be sure that the vast flora of this great country does not include some other flower than the columbine far better suited to our national needs? The great difficulty of answering such a question should make us pause, and indeed call for an indefinite postponement of judgment.

We reply: The question is fair enough, but the difficulty of answering it has been much overstated. Either of two methods will serve. The first was employed by Mr. Geddes, botanical editor of the "Standard Dictionary" and delegate from Pennsylvania to the National Flower Convention. Without prejudice he took Dr. Gray's "Manual of Botany" and went through every plant family, throwing out by a process of elimination all those plants which for

obvious reasons were quite unfit for our national flower. As a result he had just one plant left, the columbine. Moreover he assured us at the convention that before this he had not heard the columbine suggested as a candidate. Any plant not included in Gray's Manual would of course be unknown throughout the most populous sections of the country, and therefore entirely hopeless as a candidate for national flower. The second method is easier. It merely requires one to remember that many persons of all classes in all parts of the country have been doing their best for ten years to have every possible candidate considered, and that especially qualified representatives met to consider deliberately the question of a national flower from every possible point of view. There is no room for the slightest doubt that these delegates as a body were well acquainted with every plant in which the general public could have any interest, and which therefore could for a moment be considered as a candidate for national honor. Of all the flowers mentioned at the convention only one — the columbine — could meet the requirements which the convention deemed indispensable in a national flower. Hence — and the conclusion is inevitable — the equal or the superior of the columbine for Columbia's emblem does not exist. Doubtless the Creator could have made a fitter flower, but, doubtless, He never did.

Before closing, let me very briefly summarize. Each of the columbine's rivals, though precluded, as we have seen, by fatal objections from serving as Columbia's emblem, nevertheless offered some most valuable qualification. Thus, as the columbine connects itself by name historically with Columbus and the Columbian Exposition, so the Mayflower, by its name, recalls the good ship of the Pilgrims. For their widespread distribution, golden-rods, asters, and sunflowers are remarkable as well as the columbine. The golden or the purple tints of these flowers at their best match the columbine's pure yellow and purple, while the latter's near relative, the larkspur, includes among its colors the columbine's red, white, and blue. For inoffensiveness, charm, and ease of cultivation the pansy and many of the old-fashioned garden flowers have endeared themselves as much as the columbine, and for availability in decorative design it may be claimed that such flowers as the mountain laurel and the magnolia are in form hardly less exquisite and distinctive. The valuable suggestion which keeps in view our dependence upon the trees of the country would

be expressed with scarcely less appropriateness by any one of them than by the columbine, their companion, which owes so much to their protecting care. So, in the matter of agricultural supremacy, corn, cotton, and tobacco, as sample products raised on American soil, suggest the same abundance which is symbolized by the columbine's horns of plenty. The columbine, however, has this great merit, that it combines within itself the highest merits of all its rivals. Accordingly it comes as the peacemaker among the flowers. The advocates of other flowers are ceasing to contend with one another and are rallying to its cause, since in the triumph of this they see the realization of more than the highest promise of their former hope. Moreover, in its role of peacemaker, and as preëminently the emblem of peace, the columbine brings the national flower movement into most opportune relations with the present peace movement of the world. In the words of President McKinley, "The citizens of the United States have the right to be proud that their country is in the van in the efforts which are being made for international arbitration." Hence, it especially becomes us to adopt such a perfect emblem of peace as the columbine would be. Not only would this emblem announce to the world the idea of Christian policy which our nation has so long maintained, but it would also, by ever directing the thoughts of our people to the responsibilities of our high mission, aid us in maintaining the right. Thus the columbine idea, born of the Columbian Exposition, — our country's greatest celebration of the victories of peace, — becomes a part of that world-wide movement which the ages shall deem the greatest glory of this glorious nineteenth century.

We of the Columbine Association, who ask you to join us in spreading our message, offer to share with you an ever-brightening hope and a promise assured by past achievement. Our hope is that the columbine will soon win recognition as our national flower — possibly before the beginning of the new century so near at hand. Our promise is this: If you help the cause of the columbine you will be most effectively discouraging what is least worthy of the American people in the national flower movement. At the same time you will be suggesting uplifting thoughts to many of your fellow countrymen and will stir in their hearts some of the noblest and tenderest feelings. Therefore, so far as you can influence these wellsprings of national endeavor, you are helping

to shape the destinies of your country and to further the welfare of the world.

No one who has studied the growth of the popular desire for a national flower during the last ten years will permit himself to ask the question, Shall we have such an emblem? The American people may be trusted to accomplish their hearts' desire. The fundamental question for all of us to decide is this: Shall our national flower be a cause of regret or shame, or shall it be as fitting and noble an emblem as the world has ever seen? We are doing our best to bring the national flower movement to an issue of which our country may be proud. We need your help. Help us!

BUSINESS MEETING.

SATURDAY, March 5, 1898.

An adjourned meeting of the Society was holden at eleven o'clock, the President in the chair.

Charles H. B. Breck, Chairman of the Committee appointed at the meeting on the fifth of February to prepare a memorial of Edward C. R. Walker, reported the following preamble and resolutions, which were unanimously adopted:

Whereas, God in his infinite wisdom has removed from among us one who for many years took a great interest in and labored diligently for the welfare of the Massachusetts Horticultural Society, even so long ago as when the Exhibitions were held in the old Horticultural Hall on School street, and who for three years, from 1847 to 1849 inclusive, served the Society as Recording Secretary, and

Whereas, Edward Charles Rollins Walker further testified to the enduring love he bore the Society by a most liberal bequest,

Resolved, That the loss of one who was so much interested in the welfare of the Society in its infancy awakens our kindest remembrance.

Resolved, That we fully appreciate the esteem in which Mr. Walker held the Society, and that we cherish his memory, would emulate his example, and mourn his death.

Resolved, That these Resolutions be entered upon the records of the Society, and that a copy of them be sent to the family of the deceased.

CHAS. H. B. BRECK,
A. C. BOWDITCH,
WM. C. STRONG,
} *Committee.*

Charles E. Richardson presented his report as Treasurer for the year 1897, approved by the Finance Committee. It was voted that the report be accepted without reading.

President Appleton referred to the provision in Section VIII of the Constitution and By-Laws, that the President shall report from time to time what measures, in his judgment, are necessary for promoting its objects and extending its usefulness, and stated that

he was much concerned for the safety of the Library in case of fire. To guard against loss or injury from this cause, he proposed the following vote:

Voted, That the President is hereby authorized to lease rooms in a fireproof building for the use of the Library — in the Tremont Building if possible, or some other fireproof building conveniently situated in the business part of the city, at such cost as shall be approved by the Finance Committee, until such time as the Society shall have erected a fireproof building of its own; the moving to be done under the direction of the Library Committee.

Robert Manning moved an amendment that the subject be referred to the Library Committee, to be considered at a special meeting called for that purpose.

Ex-President William H. Spooner moved to lay the proposed vote and amendment on the table, and this vote was carried.

The President, in further discharge of the duty imposed on him by the above-mentioned section of the Constitution and By-Laws, introduced the following vote:

Voted, That the President be authorized to receive proposals for the bettering of the Society's accommodations by the erection of a new building on the present site, the Society to be put to no expense on account of said proposals; but the President may have such plans as may be offered hung in the Lower Hall for the inspection of the members.

This vote was passed in the affirmative.

The Secretary laid before the Society a letter from Peter Nøvik, Secretary of the Horticultural Society of Norway, acknowledging his election as a Corresponding Member of this Society, and thanking the Society therefor.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

FREDERICK LAW OLMSTED, JR., of Brookline,
JAMES F. HARLOW, of Quincy,
JAMES STURGIS PRAY, of Cambridge.

The meeting was then dissolved.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 12, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following is the substance of the lecture given:

THE RELATION OF OUR PUBLIC SCHOOLS TO RURAL AND URBAN LIFE, AND THE VALUE OF NATURE STUDIES IN OUR SYSTEM OF PUBLIC INSTRUCTION.

By GEORGE T. POWELL, Ghent, N.Y.

In the solution of any great question there are always discovered agencies or influences, which, if properly used, will be found to be closely associated with its successful settlement. There is no subject before the people today more harassing than that of the concentration of population in cities. It is affecting our social, business, and political interests. It is a problem surrounded by great difficulties. Yet, when our all-powerful educational forces are turned upon it there will be found greater promise from them than from any other present known source.

The tendency of the population to concentrate in cities during the last half-century has been marked, and the growth of cities during the last thirty years has been phenomenal. From 1790 to 1880 the population of this country increased twelve times, while that of cities of over eight thousand inhabitants increased eighty-six times. In the past one hundred years the population of New York has increased seventeen times, while that of New York city has increased forty-six times. Albany has increased its population in this same period twenty-seven times, and Rochester sixty times. From 1870 to 1890 the increase in population in New York State was 1,610,000, while the increase in value of real property was $1,659,000.000. In 1869 the value of our farm products was $253,000.000. Twenty years later it had fallen in value to $161,593,000, while the farming land of the State has depreciated fifty per cent.

These facts present some serious problems for the producers of fruits and farm crops. The growth of cities ought naturally to be of great benefit to those who grow food products, but unfortunately

in this rapid growth of our cities there is a large increase of the non-earning and dependent class, filled from the ranks of the unemployed.

It is stated by the Bureau of Labor that forty per cent of those engaged in the organized trades of our State are unemployed, and this is undoubtedly true in most of the large cities of our country. This large army of the unemployed in cities, supported by charity, are not consumers of fruits, and before we can again find ready sale for the products of our orchards and vineyards, at anything like remunerative prices, the problem must be solved of the employment and opportunity to earn a living by this large unemployed class in our cities.

There are today in New York city nearly one hundred thousand of the dependent class, supported by public institutions and by private charity, and in all of the large cities of our country will be found a proportionate number, all of which affect and lessen the consuming power of cities, and become a heavy tax and burden upon their industry and prosperity.

This is not without its effect upon the food producers of the country. The relation that exists between those living in the country and those living in the city is intimate; the prosperity of one depends upon the prosperity of the other.

There are several causes that have long been operating to draw people away from rural living. All have a common interest in the soil. We stand today the richest nation in the world on account of the wealth of our soil. We have been taking from it to support not only our own country, but other nations as well. In the older portions of the country we are feeling a want of this power in the soil itself. It is not as productive as it used to be. The three principal elements, nitrogen, potash, and phosphoric acid, are being removed. One ton of timothy hay removes from an acre of soil plant elements to the value of $5.45. It will be seen that each ton carries that value from the soil to the city. [These figures were shown on a chart which was made some time ago; the figures are a little high for today.] One ton of potatoes carries away plant elements to the value of $2.00, which is mostly in potash; wheat over $7.00. Butter removes the least of any, only about 46 cents to a ton. It is very often found, however, from impurities, that much more is taken away. This shows that butter dairying is inexhaustive. Fruits also carry very little away from the farm. Population

is now leaving the farm because the soil is depleted and farming is unprofitable.

Another cause is bringing agricultural products from interior sections of our country by railroads and canals. Other nations are doing the same thing; bushels of wheat, etc., are being brought out at cheaper cost, and we are obliged to meet this competition. The English capital is reaching into India, Australia, and South America with railroads. In Russia two thousand miles of railroad have just been completed, which will bring out thousands of bushels of wheat. In India wheat costs, to produce, only thirteen cents a bushel; in South America only twelve cents. In India, again, men work for ten cents and women for from three to four cents a day; in South America for from six to ten cents. There are other conditions there vastly different from those existing here. Eight cents will buy enough cotton to clothe a woman for a year. Manufacturing has been largely carried to cities, by railroads offering more favorable rates, and with the natural tendency for people toward community living the present facilities offered by electric and steam railways have brought about a great increase in urban population. Another cause for many leaving farms has been the introduction of improved machinery; that has required less labor to be employed on the farm.

During the winter of 1895 the influx to New York city was so great as to attract the attention of some of its most prominent citizens, who realized that, with the labor market already heavily overstocked, many of this great number coming to the city must drop into the large and rapidly growing dependent class.

Active steps were taken to inaugurate a careful inquiry into the causes that were working to send steadily increasing numbers from the country to the city. The investigation was made with the result that a surprising tendency was found among those living in the country to leave the soil and go to the city. Among other causes were found general discouragement in farming, depreciation in the value of land, low prices for products, churches supported with difficulty, ministers who once had strong congregations in their churches now are obliged to fill as many as three charges, schools declining in number and attendance, the young people leaving the farm. Many school-houses are closed, and the old district school is today seriously on the decline. There are over three thousand schools in New York with less than ten pupils each.

Some recommendations were made for educational work along some special lines, particularly in our public schools, as one of the most effective means of upbuilding the agricultural conditions of the State, and, in time, of holding and even drawing more people to the soil and to country living.

A committee of prominent citizens, known as "The Committee for the Promotion of Agriculture in New York State," was organized, with Hon. Abram S. Hewitt as Chairman, Robert Fulton Cutting, Treasurer, and Dr. William H. Tolman, Secretary; and under the auspices of this committee a series of agricultural schools was held for farmers in Westchester County. During the winter of 1896 a course of lectures on natural sciences, somewhat on the line of university extension, was given in the public schools of the same county. Instructors were sent out by Columbia and Cornell universities. The high schools of the towns or villages, and the district schools, were reached, and lectures given upon the soil, plant, insect, and animal life, with the application made to country living. Teachers and pupils were generally interested in this kind of instruction; members of boards of education and, in many instances, farmers came in to listen to the lectures given in the schools, and they expressed approbation of the plan, which was helpful to the children and instructive to all.

Many teachers will ask, how is it possible to introduce anything more than is already taught? It is not proposed to introduce extra work. Five or ten minutes two or three times a week as incidental instruction, when it seems almost impossible to make progress in the regular work, is the time to introduce a nature exercise. That school hours are often too long is shown by an experiment tried in Berlin. The school superintendent complained that at the end of the school hours the pupils were so exhausted that it was impossible to accomplish the best results. A test was laid out of ten minutes of work with five minutes' rest between. In the first two periods the work was satisfactorily done. In the third period a loss of memory was noticed and errors were found. In the fourth period the errors increased. In the fifth it was useless to try to do further work. The result was a shortening of school hours. If nature studies are brought in in the last period of the day it is a great help to the general work. Children come in better prepared for study the next day.

In New York, text-books are not thought of; the point is to go

to Nature herself. It is of vital importance that teachers know how to introduce methods. For an example of how the teaching is done, seeds may be used. Seeds which represent plant life in the vicinity of the school-house are brought in; also seeds of food products, garden plants, grains, and fruits. If beans are used as many as twelve different kinds can be shown which differ in size, color, and shape. These differences attract the children's attention at once. Seeds of timothy grass may be sent around among the children for them to examine; afterwards a magnifying glass is sent around with the seed. Clover seed is next observed in the same manner. A description of the plants, the root, stalk, leaves, and fruit is called for. An excellent language lesson may in this way be obtained. The teacher draws the plants on the board and points out the difference between them. This principle can be carried through all studies. Chemistry can be taught from the different elements which enter into the plant during its growth, and which are required to feed it. Physiology can also be studied through the agency of plants, and it can be shown that clover contains the elements required to give young animals strength, and should remain on the farm, while timothy is deficient in right food elements for young animals, but gives the necessary food for older animals, and should go to the city, where the older animals are found. Children can be taught why clover is so valuable to renovate the soil by showing them plants which have nodules on the roots, and giving lessons on how these nodules take the nitrogen from the air. If our farmers of half a century ago had understood this it would have been worth millions of dollars to the country. An interesting experiment was tried in 1896 in connection with the study of plants. We made this offer to all children of the schools of Westchester County, who would be interested in a practical and systematic way of studying a plant, that on application from them, in the spring, we would send them by mail, free of cost, half a dozen strawberry plants.

The children were to set the plants, a small circular being sent giving a few directions to aid in setting them properly. They were to learn all they could about the growth and habits of these plants, and they were required to write compositions on what they were learning and give the same to the school.

Large numbers of applications came in from boys and girls for

the plants. The pupils of the grammar schools of New York and Brooklyn observed in the papers the notice of the offer, and they sent in applications, some saying in their letters that they had no garden or soil, but they would get boxes of earth, put the plants in them, and place the boxes on the roofs of their houses. The offer of plants to the school children of Westchester County was copied by the agricultural and local papers of the State, and applications came from school children and teachers in almost every county in the State.

Nearly two thousand strawberry plants were sent to city children, and over ten thousand to those in the rural districts of the State, which was striking evidence of the interest children felt in taking up the study of a plant when proposed to them that it should be with the plant itself rather than from a book.

The strawberry was chosen because it is an interesting plant in itself; its blossoms are beautiful, and there is a marked difference in them, as some are fruitful and others, because of their construction, are not. The different parts of the flower were shown and explained upon printed charts in the lectures given in the schools. The economic value of the plant was also treated, and in addition to its beauty its possibilities were presented in furnishing support and income to those who skilfully managed it.

In many instances the study of insects was connected with that of plants, and the chief enemy of the strawberry, the white grub, was illustrated upon the same chart with the plant. The May beetle or June bug, which is the same, is the progenitor of the white grub that does so much damage to strawberry beds, and the life history of this insect was given in connection with the study of the plant. This never failed to give added interest to the pupils in the presentation of the subject.

The most practical way to teach is through an object lesson. Apples which are diseased or wormy, if shown to the pupils, will lead the way to a lesson on apple insects and diseases; the story of these insects or diseases can be told, and charts can be used to illustrate the story. Ten years of this sort of study will enable us to produce a race of intelligent and skilful farmers.

In the lectures given the thought of the possibilities of improvement of rural life through the schools was made prominent. The most familiar subjects connected with the farm and home and those surrounding the school were chosen.

The schools in the great orchard districts of the State should give some instructions to those living in and surrounded by this great industry that would help them to understand and know something of the fungous diseases and insect enemies that annually bring from fifty to seventy-five per cent of loss because of want of knowledge upon these subjects.

M. V. Slingerland, assistant entomologist of Cornell University, has estimated that the loss to the apple and pear growers of New York annually caused by the codling moth is fully $3,000,000, while Dr. J. A. Lintner, the State entomologist, estimates the loss to New York annually from all insects to be $26,000,000. Massachusetts furnishes in the gypsy moth an illustration of the damage that one insect may do and the cost of its control or extermination. Ireland is today pinched and suffering, and seriously threatened with famine from the failure of the potato crop, caused by a fungous disease that is readily controlled. but not understood by those who are growing that important food product.

Our public schools can do much to build up agriculture and bring a higher degree of prosperity to those who live in the rural portions of the State. Nature study is not to be introduced in our schools for the purpose of educating boys and girls to become farmers and fruit growers. It is to give a new inspiration and interest in the study of all subjects, and while the study of the soil upon which all depend for existence, and the study of animals, plants, and insects, will especially help those who do live upon farms, in the larger knowledge that will come from this study it will be of value to all, whatever the future occupation or living may be.

The value of this rational kind of instruction was so widely recognized that the demand for it throughout New York State became unexpectedly large.

Prof. L. H. Bailey, in 1896, was conducting a series of horticultural schools, under what is known as the Nixon Appropriation, made to Cornell University for the promotion of horticultural knowledge in the Fourth Judicial Department of the State. He arranged for a series of lectures, to be given in the public schools of this department, comprising twenty-two counties. The lectures on nature topics were to be given on the plan inaugurated in Westchester County, able instructors being furnished from Cornell

to assist in the work. In this broader field the instruction was enthusiastically received at every point.

The Committee for the Promotion of Agriculture, realizing the importance and value of extending this instruction to the whole State as one of the most effective ways to improve the condition of the rural population, turned its work over to Cornell University.

It was felt that with the strong equipment of scientific instructors in agriculture Cornell could best meet the needs of the State and fulfil the object of the committee in its investigation, to institute means that would eventually tend to equalize population, check the great flow to cities, and hold the people more prosperously and contentedly to the country. During 1897 Cornell has had several instructors in the field.

A large number of schools have received lecturers, leaflets have been issued as helps to teachers in the presentations of nature subjects, and teachers' institutes have had special instructors to give methods in nature teaching, the Department of Public Instruction coöperating in this progressive educational movement.

While the condition of the agricultural population of New York and New England has been one of discouragement and depression for the last quarter of a century, there may be said of New York that there is an uprising of educational interest at the present time such as has never before been known. There is an earnest desire to throw off old conditions; there is an active demand for knowledge, and a spirit of inquiry is everywhere marked. Greater knowledge and a broader education are newly felt as one of the greatest needs in farm life, and the effort to reach this through our public schools is meeting with hearty and universal support. A few years of the present line of instruction given in our schools will greatly aid in the permanent upbuilding of all interests of the State and of society, both rural and urban.

Discussion.

The President said he had just attended the fifty-sixth anniversary of the Worcester County Horticultural Society, and that a speaker there referred to the great value of such lectures as we have had today. The cultivation of the power of observation might be the salvation of the country.

Philip Emerson spoke of chrysanthemums which had been given

children at Natick by the gardeners of some of the large estates in Wellesley. The results which the children obtained were surprising, and much better than the gardeners thought possible. He said that the growing of beans and similar seeds had been encouraged in the upper grades, and thought that if some committee could send out practical directions for nature studies the schools would gladly take the matter up.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 12, 1898.

A meeting for Lecture and Discussion was holden at eleven o'clock today, Vice-President CHARLES H. B. BRECK in the chair.

The following lecture was delivered on the John Lewis Russell Foundation:

THE RESISTANCE OF PLANTS TO PARASITIC FUNGI.

By EDWARD A. BURT, Ph.D., Professor of Natural History in Middlebury College, Middlebury, Vt.

Fungi are defined as plants with vegetative body not differentiated into stem and leaves; and they do not contain the green grains called chlorophyll. Fungi are propagated by spores, or by portions of the vegetative body, some one or all of which may give rise to an independent plant or plants.

Place of Fungi in the World's Economy. — During the present decade so much is being published on the destructive work of parasitic fungi that the general reader must be on his guard, lest he conclude too hastily that all fungi exist in this world merely to cause disease or perhaps death of more highly organized plants which might produce food for the animal world or contribute to its æsthetic gratification. When the horticulturist has his carnations destroyed by the rust, his seedlings ruined by the damping off fungus, his peas produce a crop hardly worth the picking through the mildew, his potatoes a failure by the rot, his apples and pears of an inferior grade by the scab, and perhaps his family brought to the verge of death by diphtheria or typhoid fever, — when he realizes that all these troubles and many others which your own experience may suggest are due to fungi, it is no great wonder that he sees but small compensation in the crops of mushrooms which

he has grown, and is tempted to conclude that fungi could be spared from this world. But he might with equal reason conclude that the rains of summer are of no avail, because they gully his fields, sprout in the shock the harvested grain, and drench himself to the skin.

Fungi have an important and a peculiar work in the world's economy. The green plants which contain chlorophyll are constantly converting carbon dioxide, and the earth's available store of inorganic matter in the soil, such as water, soluble phosphates and nitrates, salts of potassium, calcium, iron, etc., into complex organic compounds of thallus, fructification, stem, leaf, and root. A portion, and only a comparatively small portion of the whole, of this organic matter, at various times in the course of its formation, is used as food by animals and is broken up into simpler compounds and returned to the soil. At the end of the season or at death of the plants the unused plant matter is left to accumulate on the surface of the earth. We can form some idea of the amount of this accumulation for a single season by the abundance of dead leaves on the ground in autumn in our streets and forests, and by the dead stems and leaves of grasses and weeds which may stand knee-deep or waist-deep in some field left undisturbed by man and his flocks. As trees and other woody plants die their trunks and branches become a part of the accumulation on the ground, as we see in primitive forests.

If kept permanently in the form of dead leaves or dead wood organic matter would be of no more value to the soil than any other covering. Its stores of carbon, nitrogen, potassium, phosphorus, etc., are not in forms available for use as plant food, by the green, chlorophyll-containing plants. Decay must take place first; that is, the complex molecules of insoluble organic compounds must be broken up into simpler, soluble forms. Could decay and the consequent return of food matters to the soil be prevented, in the natural order of things the soil would lose its stores of plant food and become covered by a deep accumulation of dead organic matter.

Fungi are the causes of decay. They thrive in moist places and light is not essential to their growth. The dead leaves and wood of the higher plants, and all dead organic matter which is not kept too dry for their growth, or at too high or at too low a temperature, or without special protection, is soon attacked by myriads of

fungi, ranging from microscopic Bacteria and Moulds through minute Ascomycetes to conspicuous Basidiomycetes, such as species of mushrooms and Polyporus. Fungi make prompt return to the soil of plant and animal remains which would otherwise be withheld from it. The soil does not contain such an abundance of plant food that the work of such fungi, called Saprophytes, can be dispensed with.

While most fungi are saprophytes and have to do only with dead organic matter, still very many others are to be found in more intimate contact with living organisms, and more especially with the higher plants. In some cases the higher plant suffers by the contact, and then we apply the term *parasite* to the fungus; in other cases the higher plant, or perhaps both organisms, gain by the association, which is then called *symbiotic*. We can consider the latter relation but briefly.

Symbiotic Fungi. — It has long been known that growing leguminous crops, such as clover and peas, increase the amount of nitrogenous matter in the soil and can be advantageously used for its improvement in a rotation of crops. The source of the nitrogen of these compounds is the free nitrogen of air circulating through the soil. It is only within a dozen years that it has been established that the fixation of the nitrogen into compounds is due to the presence in the soil of fungi of a low order. Small tubercles form on the leguminous roots at the points where the fungi are in contact with them, and at these points the fungi yield nitrogenous substance to the roots and appear to receive starch compounds in return. We are too near this discovery to see its real magnitude, but, in its economic aspects, it will probably rank as one of the great discoveries of the century.

Leguminous plants are, perhaps, not the only ones directly dependent on fungi for food to some extent. The investigations of the last few years indicate that many plants and even trees, as the Coniferæ, growing in a soil largely composed of humus, are deficient in root hairs, and are clothed instead with a fungous growth of mycorhiza. The whole subject is in the field of active study at present, but it seems to be established that the fungus supplies food matter, presumably from the humus, to the higher plant. But when we reflect on the fact that the saprophytic fungi are converting insoluble and highly complex organic compounds into the soluble plant food of the soil, why should we not expect to find

some of the higher plants which use this food in close association with the agents supplying it?

With the conception which has been briefly outlined of the place of fungi in the world's economy we now turn our attention to fungi in their injurious relations to higher plants — to cases where the fungus anticipates the death of the higher plant and lives a parasitic life.

Parasitic Fungi. — Parasitic fungi are those which, stimulated by the cell contents of another living plant, penetrate wholly or partly into its tissues, and draw their nutriment from that source. *Obligate parasites* can live only in the parasitic condition; *facultative parasites* can live wholly or partly as saprophytes, and, under favorable conditions, exist wholly or partly as parasites.

Parasitism depends on the possession of a combination of characters by the fungus, adapting it for invasion of, and for maintaining itself in, the host, and on the lack, or presence in too slight degree, in the latter of means for repelling the invasion or destroying the invader. In many cases the contesting plants are so equally pitted that external conditions, as wounds, periods of wet weather or of drought, cold nights, or the presence of a fungicide, give to the favored contestant the decisive advantage. The requirements for the fungus are:

1. Ability to maintain its life during the critical period of germination from the spore and for an interval afterward. During germination, and usually for some time afterward, the incipient organism is wholly dependent for food on the supply contained in the spore.

The spore, however, is only a single cell or a group of cells, each capable of independent germination. The spores are produced in vast numbers. In size they are like the finest dust, having a diameter in some cases of only 1μ ($\frac{1}{25000}$ in.), but usually averaging ten times that size. Each contains a nucleated mass of protoplasm, except in the bacteria, and carries but little food substance.

In order that the spore of an obligate parasite may infect a plant it must fall on a suitable species and then germinate and throw out a germ-tube which can penetrate the host and obtain food from that source in the short time for which the original supply of the spore is available. This is a very critical period in the life history of a parasitic fungus, and only a very small

proportion of the germinating spores can survive the ordeal if the environing conditions are at all unfavorable. Too dry an atmosphere immediately after germination deprives the would-be parasite of its moisture and kills it. An equally fatal result follows if the delicate germ-tube has to creep over a surface coated with poisonous copper salts or other fungicides; this is the philosophy of spraying against fungi as now practised in horticulture.

2. After germination the fungus must be able to make its way through the defensive structures on the outer surface of the host. This is the second requirement which the fungus must satisfy, but this will be taken up later on in connection with the host plant.

3. The fungus must be able at the least to hold its place in the tissues of the host and to draw its supplies of food from that source, in spite of the resistance encountered.

The plant attacked is a complex structure, the result of cumulative successful variations of a long line of ancestors before man began its cultivation. A stream of water containing plant foods in solution enters the plant at the roots, passes the length of the stem, and emerges from the leaves and other aerial surfaces in the form of a vapor, usable and non-volatile portions of the stream being retained. Primarily, the structure of the plant is adapted to the maintenance of this food-supplying stream; the root surface is adapted to its absorption; the leaf structure to its transpiration; and the stem structure and surface to its transfer from root to leaves with the minimum of evaporation. At the roots and at the leaves and young shoots the structural requirements for absorption and transpiration of the stream are opposed to the formation of a covering impenetrable by parasitic fungi; nevertheless we cannot but believe that the attacks of these fungi have been to some extent a factor in the evolution of structure of the higher plants.

The nature of the attack made by fungi against each surface of the host, and the resistance which is encountered, may be considered with advantage in connection with some common diseases which have been best studied.

The Root as the Region of Attack. — For a short distance back from their tips the smaller roots and rootlets have their superficial cells with thin uncuticularized walls through which water is readily absorbed. Lateral outgrowths of these are the root hairs. This

outer layer is soon cut off from the internal tissue of the root by the formation of a deeper seated cork layer, which gives to the older roots a bark, or protective covering, very similar to that of the corresponding stem, to be described further on. Infection of the root may therefore occur by plant structures able to bore through the mechanically resistant covering of cork, or by organisms able to penetrate the root hairs and get deep enough into the interior of the root so as not to be shut out by the formation of cork. We will consider first the latter mode of infection.

Plasmodiophora Brassicæ, the fungus causing club root of cabbage, turnips, and other Cruciferæ, is one of the most successful fungi attacking plants at the root. The disease attacks young seedlings and older plants; its symptoms are shown in from three to five weeks by the wilting of the leaves, which become lighter colored and rather yellowish. The characteristic swellings may then be found on the roots. Cabbages suffering from this disease fail to head.

If thin slices, cut from one of these swellings with a razor and placed in a drop of water on a glass slide and covered with a cover glass, are then examined with a compound microscope, the fungous cause of the disease may be seen. Many cells of the root are swollen to many times their usual size, and they contain the fungus in different stages of its development. Some show it in a plasmodial stage, with its young protoplasm only partially filling the cavity of the cell; in others the plasmodium is fruiting and becoming a mass of minute spores. If sown in water these spores germinate in a few hours, producing motile, ciliated swarm-spores. The ciliated swarm-spores infect sound plants, it is believed, by penetrating their root hairs and passing from thence into the deeper cells where starch is stored. Such penetration has not yet been observed, however, and it may be that they gain access to the interior of the root through punctures made by worms and insects, but the former mode seems the more probable.[1]

This disease is especially troublesome to truck growers, because they do not practise a long-period rotation of crops. Roots or portions of roots infected with the fungus are left in the ground or on its surface when the crop is harvested. The spores are liberated through decay of these roots, and they remain alive in the soil for several years. If another crop of cabbages or turnips is

[1] Eyclesbymer: "Club-root in the United States." "Journal of Mycology," 7: 83.

planted in this soil the following season it becomes infected at once, and so the disease is propagated from year to year.

Halsted announces that air-slaked stone lime is an effectual preventive of club root, and the best so far found. It should be used at the rate of from seventy-five to one hundred and fifty bushels per acre, and spread on the ground in the fall, and not turned under until spring to insure the best results. Applications should be made every other year to severely clubbed land on which turnips or cabbages are grown yearly.[1] This method of treatment seems well adapted to the needs of market gardeners.

Not much is known of the resistance which plants offer to infection of their roots by Plasmodiophora. The cabbage and the turnip seem quite helpless when pitted against it, judging by the certainty with which the fungus wins. That some resistance is offered may be inferred from the fact that all species of Cruciferæ are not equally susceptible to the disease. Halsted[2] has made observations on the comparative susceptibility to club root of sixteen species of Cruciferæ. He finds that charlock is the most susceptible on his list; white mustard, second; penny cress, third; shepherd's purse, seventh; black mustard, ninth; and so on. One is surprised to note that charlock, *Brassica Sinapistrum*, one of our commonest weeds, is the most susceptible species on the list. Club root is fatal to the cabbage and turnip. How is this weed able to survive? Its survival affords an object lesson for the horticulturist. Its seeds are produced in abundance and become widely distributed. Not all fall in an infected seed-bed; but those which do suffer the penalty. Many lodge in ground free from the fungus, and there they grow and perpetuate their kind. Dissemination of seeds should be regarded as one of the adaptations by which a species, in some cases, may successfully resist extinction by a more powerful fungus.

Infection of the root is more usually by mycelium, which creeps through the ground from root to root only a few inches below the surface. A "root rot" of some kind is the result, as of the grape by *Dematophora*, of the pine by *Armillaria mellea*, and, perhaps, of the beet and alfalfa by *Rhizoctonia*. One of these fungi, *Armillaria mellea*, the honey mushroom, is very common in our woodlands in

[1] N. Jersey Ag. Exp. Sta. Rep. for 1894, pp. 285 and 288 (1895); and Rep. for 1896, p. 306 (1897).

[2] N. Jersey Ag. Exp. Sta. Rep. for 1896, p. 309 (1897).

September, growing about stumps. The pilei arise from black, root-like strands, called rhizomorphs. Hartig[1] finds that when the fungus is well established in a root system rhizomorphs grow out and extend through the ground often for a distance of several feet. If they come in contact with the living root of a pine they are able to bore their way into it. Then the individual hyphæ of the rhizomorph spread through the resin ducts and medullary rays to all parts of the roots and stump, killing the tree and producing a form of decay called "white rot." *Armillaria* is very common as a saprophyte. Hartig states that it is a very destructive parasite on all conifers, and also on *Prunus domestica* (common plum) and *P. avium* (Mazzard cherry).

Epidermal Covered Surfaces of Leaves and Young Shoots as a Region of Attack. — The leaves and younger portions of the stem of woody plants, and the whole stem of herbaceous plants, are covered by colorless transparent cells arranged side by side, in most plants in a single layer, called the epidermis. The outer wall of the epidermis is cutinized, *i.e.*, naturally waterproof. This waterproof covering prevents rapid evaporation of moisture from the tissues of the living plant, and their consequent desiccation. As already stated, water vapor is constantly being exhaled from the epidermal-covered leaves and shoots, but it is by a regulated transpiration from deep-lying cells, and it emerges through openings in the epidermis, called stomata. The stomata open and close automatically, regulating the transpiration stream to suit the needs of the plant. In dry weather the stoma is nearly closed; in wet weather, with the atmosphere nearly saturated, the guard-cells of the stoma become turgid with water from the root, more spherical in form, and give a larger opening for the stoma.

While the epidermal covering prevents the plant from excessive drying it is also of great importance as a means of resistance to fungous invasion by withholding moisture from the fungus spores on its outer surface, and by interposing a barrier which must be pierced. As the epidermis is waterproof the spores which lodge on its outer surface can receive no moisture from the succulent tissues of the plant, but are entirely dependent for moisture for germination on that which condenses on the leaves as dew or falls as rain. In dry weather spores are very apt to fail to germinate, or if germination does occur in the short period during which the

[1] "Diseases of Trees." Eng. trans., p. 209, 1894.

leaves are wet with dew the delicate germ-tube, less able to retain its moisture than the spore, is likely to perish on the following day. If the leaf has a waxy surface or a form likely to cause the moisture to collect in drops and fall from the leaf, this is an additional advantage against infection.

On the other hand protracted rains, not so violent as to wash the spores from the leaves, or murky weather with frequent showers and the air nearly saturated with moisture, favor germination of the spores and enable their germ-tubes to attack the epidermis with full vigor or to grow over its surface to a stoma. In such weather the stomata are also widely open, as already stated.

Penetration of the Host. — The behavior of the fungus immediately after germination varies with the species. In the powdery mildews (Erysipheæ) forming white coatings on leaves and young shoots, as of the pea, rose, and lilac, the germinating spore gives rise to a cylindrical thread-like body, called a hypha, which branches and spreads over the surface of the epidermis. From points of the hyphæ, in contact with the epidermis, branches push down directly against the epidermal cells, cause minute openings in the wall, and through these gain entrance into the protoplasmic part of the cells. Here the end enlarges. Such branches are called haustoria. Through the haustoria the fungus draws its sustenance from the host, while the main body of hyphæ remains on the outside, forming the familiar white patches.

These powdery mildews are easily destroyed. Any substance poisonous to the fungus, but not injurious to the host, may be used for the purpose, as flowers of sulphur dusted over the leaves.

Most parasitic fungi gain entrance to the deeper lying tissues of the host as soon as possible after germination. In some cases the germ-tube creeps along on the surface of the leaf until the end reaches a stoma and then curves through this into the intercellular space beyond. The æcidiospores and uredospores of the rusts illustrate this mode of penetration. In other cases the germ-tube may grow directly through the epidermis into the underlying tissue, or, more rarely, it may grow down through the epidermis in the partition wall between its cells.

The young leaves and tips of branches are more susceptible to infection than the older parts. The common corn smut can infect only the young seedlings and other immature parts of the Indian corn. These young portions of the plant are tenderer than they

are when older, their cell walls are thinner and less strongly cutinized, and they probably offer less mechanical resistance to penetration by the fungus, and are more permeable to ferments secreted by it. From these differences in susceptibility of young and old epidermal-covered organs we may infer the nature of the resistance against fungous attack afforded by the fully developed epidermis, and how excellent a protection it is under normal weather conditions.

Bacterial Brown Rot of Cruciferous Plants. — We have now to consider a disease of great interest, because the infecting organism so successfully avoids the outer defences of the host. I refer to the bacterial brown rot of cabbages and other cruciferous plants, which was first described, and its cause determined, by Pammel,[1] and has recently been more fully studied by Smith.[2] The bacteria, *Pseudomonas campestris* (Pammel), Smith, causing the disease are believed to become scattered over the leaves with the dust or to be left there by insects crawling on healthy plants after they have been on, or perhaps biting into, diseased plants.

The cabbage has openings, called water pores, along the margins of its leaves. During cool nights in summer the roots absorb more water than can be transpired from the leaves, and it accumulates in their cellular and vascular tissue under sufficient pressure, so that it finally oozes from the vascular tissue through the water pores and stands in drops along the edges of the leaves.[3] As the water accumulates along the margins the bacteria which happen to be lodged there simply swim through the pore into the leaf and spread the disease along the vascular bundles. Infection also occurs by the bites of insects which have been feeding on diseased plants. The spread of the disease is shown by the brown veining it causes, which contrasts against the dark green of the leaf. Both these ways of infection are exhibited in a specimen which you may examine, and for which I am indebted to Dr. Smith. From fifty to one hundred and fifty separate infections were often seen on cabbage plants in widely separated localities.[4]

Bark-covered Surface of the Stem as a Region of Attack. — The epidermis of woody stems usually becomes disorganized in a

[1] Iowa Agric. Coll. Exp. Sta. Bulletin, 27 : 130, pl. 1, 1895.

[2] "Centralblatt f. Bakt., Par. und Infekt.," 2 Abt., Bd. 3, pp. 284, 408, 478, pl. 6., 1897. "The Black Rot of the Cabbage." "Farmers' Bulletin," No. 68. U.S. Dept. of Agric., 1898.

[3] Vines: "Text-Book of Botany," p. 699, 1895.

[4] "The Black Rot of the Cabbage," p. 6.

few years, and is replaced by bark, largely composed of cork. Although certain openings (lenticels) through the bark for aeration make places for lodgment of many Ascomycetous fungi; nevertheless the bark, as long as intact, affords an effectual barrier against parasitic fungi very destructive to wood. Breaks through the bark occur frequently, however, as by the boring of insects, the gnawing of animals, the breaking of branches, bruises of implements of man, and improper pruning.

An attempt at repair of these wounds is made by the natural processes characteristic of the plant, as by the formation of cork or of callus and new cambium. If the wounded surface is large, many years will be required for it to heal, and during all this time it is liable to infection. Coniferous trees, as the pine and the spruce, which are especially subject to attack, pour forth a pitch from wounded surfaces of the sap wood. This gradually hardens, and forms a protective covering, although the heart wood, which is destitute of pitch, may remain exposed to infection, if the wound is large. The deciduous-leaved trees which we cultivate lack such a natural ointment for their wounds. We can make good the deficiency by applications of grafting wax, coal tar, or paint, to their wounded surfaces, and greatly diminish the risk of infection. When large branches have to be removed from a tree they should be cut from it so close to the trunk or to some vigorous branch that liberal food supplies will be available for rapid growth about the edges of the wound. Dead wood projecting from a living tree and raw wounds furnish places for infection by the spores of parasitic Basidiomycetes. We often see the bracket-shaped fructifications of these fungi standing out from dead places in living trunks of trees, and becoming larger year by year as their hyphæ spread through and destroy the living wood of the trunk.

The Fungus in the Interior of the Host. Growth of the Fungus and Effects produced. — A germ-tube or hypha, reaching the interior of the host, branches and forms a mass of hyphæ called collectively a mycelium. Many fungi have a mycelium which extends for only a very short distance beyond the point of infection and causes merely local disease. This is the case with many "spot diseases" of leaves, which often, aside from their disfigurement of the foliage, apparently cause no more injurious effect on the plant as a whole than would result from the destruction of the same areas by insect work.

In other diseases the mycelium may spread more extensively from the point of infection, causing serious disturbance, or death of whole organs or the entire plant. *Armillaria mellea* destroys the root system of conifers, and causes death of the tree. *Pythium De-Baryanum*, the best known damping-off fungus, spreads over the ground of the seed bed, and kills seedlings by infecting and destroying their lower parts usually.[1] *Phytophthora infestans*, the late blight, or potato-rot fungus, spreads with great rapidity through the plant. Its infection is likely to occur in the leaves.

The hyphæ forming mycelia grow either between the cells of the host, usually giving off haustoria laterally, which pierce the adjacent cells and absorb food, or, in other species, of which the potato rot (Phytophthora) is an example, they may push directly through cells in the way. Destructive effects may immediately follow infection (Phytophthora), or the fungus may live for a long time in the tissues of the host, extending its mycelial system, and drawing food supplies by haustoria, and then abruptly form its fructifications, at the same time killing the infected tissue.

Different parasites absorb different substances from their hosts. Attention has been called already to the fact that the powdery mildews penetrate the epidermal cells, with their haustoria, and absorb through their delicate walls portions of the nutrient matters of the protoplasm. The reserves of starch which accumulate in the cells of the host are an especial object of attack with the potato-rot fungus, Phytophthora, and with many wood-destroying fungi.

The cell wall is also a chief object of attack by wood-destroying fungi. They "rot" the wood. Lumber dealers have several terms descriptive of the kind of rot characteristic of the species, as red rot, white rot, dry rot, etc. *Trametes Pini* produces "ring shake" in pine wood. The hyphæ of this fungus act first on the lignified portions of the partition wall, dissolving and absorbing first the middle layer (primary membrane) of the wall, and thus loosening the cells from each other. At the same time they are dissolving the incrusting lignin of the secondary membranes of the wall, and there is finally left only a thin cellulose membrane bearing the ash constituents.[2] Other fungi, as *Polyporus borealis*, which I find

[1] See Galloway: "Notes on the Fungus causing Damping-off." Trans. Mass. Hort. Soc., Part I., 1891, p. 230.

Atkinson: "Damping-off." Cornell Univ. Agr. Exp. Sta. Bulletin, No. 94, 1895.

[2] R. Hartig: "Diseases of Trees." Eng. trans., p. 52.

occasionally on spruce trees in the Green Mountains, are stated by Hartig to exert a more selective action on cellulose.

I have called your attention to these details of the work of a few parasites partly that you may understand why it is that a given species is restricted to so few hosts. Each would-be parasite may be regarded as representing a definite number of capabilities. There are but few higher plants exactly suited to its needs. With resistance to be constantly overcome an unfavorable environment is a fatal handicap.

The effects of the fungous hyphæ on the cell walls of the host indicate solutional work as the explanation of the phenomenon of penetration and destruction of the cell wall. The hyphæ secrete substances, called ferments, capable of dissolving lignin and cellulose of the walls. When the tip of a hypha or haustorium is applied to a wall the portion in the way is dissolved before it, if the living cell cannot counteract or dispose of the ferment. There must be differences in the ferments secreted by different fungi, as has been pointed out by Hartig in a case of starch preservation.[1] A piece of oak wood was infested with *Polyporus dryadeus* and *P. igniarius* simultaneously. In the region of the wood where the unlike kinds of mycelia met, the starch was well preserved in the cells, while in other parts of the wood occupied by either fungus alone it was wholly destroyed.

In many cases cells of the host are killed by mere contact of a hypha without penetration. Some fluid poison from the fungus must have soaked through the wall of the cell, through the resisting protoplasmic lining of the cell, and exerted its deadly effect on the protoplasm. Oxalic acid in the form of free acid is produced by many fungi. This acid is very poisonous to living protoplasm. It has been suggested that fungi may kill the cells of the host by flooding them with oxalic acid, perhaps aided by a ferment.[2]

Internal Resistance to the Fungus. — Successful resistance to fungous invasion by cells in the interior of the plant seems to depend on vital processes of these cells when in normal health and full activity. We know how subject to rot fully ripe fruits are, as for example the apples now stored in cellars. Yet they cannot

[1] R. Hartig: "Zersetzungserscheinungen," 1878.

[2] Ward: "Croonian Lecture on Relations between Host and Parasite," Proc. of Roy. Soc. 47: 428, 1890.

rot except as the result of fungous attack, and observations on their infection by the fungi concerned in their decay (*Penicillium glaucum*, *Trichothecium roseum*, etc.) have led to the conclusion that fungi develop more easily the nearer the vital powers of the parts attacked are to their lower limit.[1] The same thing has been found to be true for the vegetative organs of several species of succulent plants which have been studied, and Tubeuf adds that fungi can frequently penetrate withering plant organs, while they could not infect the fresh living tissue.[2]

De Bary made an interesting experiment showing that the entrance of a hypha into a cell is dependent on the condition of the protoplasm: A mature firm shoot of a Petunia was infected with the mycelium (of *Botrytis cinerea*) and the hyphæ penetrated into the cortex about 1 cm., and then grew no further; evidently because the cell walls were thick, and their protoplasm disposed of the poisonous zymase (ferment) as fast as it reached them. When the infection was made on slightly etiolated, rapidly growing shoots, however, the fungus entered at once, and destroyed the entire shoot offhand.[3]

Ward[4] has called attention to the fact that wet murky weather, with frequent showers and a nearly saturated atmosphere, especially if the nights are cool, interferes with the normal physiological processes of plants and lessens their capability to resist fungous attack. The transpiration stream is checked by the already saturated condition of the atmosphere, yet absorption by the root continues. The cell walls become suffused with water and organic acids. In such weather the plants are, physiologically, in the condition of somewhat etiolated shoots with lowered vitality, and their cells offer less than their usual resistance to the fungus. They already contain an abnormal amount of acid — more than they can dispose of — and are unable to use up the additional amount with which the fungus floods them. Therefore the fungus prevails.

It is a matter of experience that the weather conditions just described usually result in an epidemic of fungous disease. Enough fungi and spores to start an epidemic are usually about in summer. I have already pointed out how such weather favors

[1] De Bary: "Morph. and Biol. of the Fungi" Eng. trans., p. 380.
[2] Tubeuf and Smith: "Diseases of Plants," p. 58, 1897.
[3] Quoted from Ward's "Croonian Lecture," p. 430.
[4] "Croonian Lecture," p. 430.

the fungus spores in their germination and in their penetration of the epidermis. If such weather also lowers the vitality of the host plant below the point of successful internal resistance, we can see why the disease is able to spread rapidly over entire fields and whole States as an epidemic.

A fungus may be well lodged in the tissues of a host and yet receive such effective resistance as to be able to make headway only when the vital processes of the host are dormant. This is well shown in the contest between the European Larch and *Peziza Willkommii*, a wound parasite which spreads in the bast and wood of the larch about the point of infection, killing the affected portions and producing a canker. During the season of active growth of the larch, the fungus makes no headway and is, in fact, shut off from the living tissue of the host by the formation of a layer of cork. During the autumn and winter, with the cessation of growth of the larch, the fungus breaks through the cork barrier and advances further into the living tissues of the host. As soon as the canker spot makes its way completely around the trunk, death of all parts higher up results. Hartig has studied cases which afford evidence of such a contest having been waged for a hundred years.[1]

Many other examples might be given, but those cited show that the protoplasm of living cells in the deeper tissues of the plant has an important part in the resistance to fungus infection, and that their maximum resistance is offered when they are in good health and full activity.

Resistant Varieties. — Observation tends more and more to show that some varieties of a species, and some species, are more resistant to fungi than other varieties and species perhaps closely related. In the past the originators and introducers of new varieties of cultivated plants have fixed their attention too exclusively on productiveness, marketable character, flavor, color, beauty, etc. Horticulturists will eventually recognize that ability to resist parasitic fungi is also a very desirable character in a variety, and varieties having the qualities which we now prize so highly will then be developed from more resistant species and races. From this point of view, the Japanese Plums, with their greater freedom from black knot than our varieties of *Prunus domestica*, are well worthy of the consideration they are

[1] "Diseases of Trees." Eng. trans., p. 120.

receiving. By patient hybridizing experiments Europeans have obtained vines with roots capable of resisting phylloxera, with foliage proof against the downy mildew, and with fruit giving the esteemed flavors to old and well-known European wines.

Eriksson's researches on grain rusts have shown that there are some varieties of wheat able to resist the more frequent forms of rust, and in no way endangered by them. By the same method varieties adapted for the rust-infested districts of Australia have also been obtained.[1] Such results show what may be accomplished.

Transmission of Fungous Disease to Offspring. — We have hitherto been taught by writers on plant diseases that diseases of plants are not transmitted to the offspring. Hartig states that[2] "A transmission, by inheritance, of diseases to descendants is unknown in the vegetable kingdom. One may without hesitation make use of the seeds of plants suffering from any conceivable disease for the propagation of new plants." Eriksson's recently published researches into grain rust[3] are opposed to this conclusion. He found that outbreaks of rust occur in grain fields in a way quite inexplicable by our former knowledge of rust, and he was led to suspect that the seed might have been infected by the parent. For the last four years he has therefore been growing plants in sterilized earth in glass houses specially constructed to keep out the spores of the disease which may be floating in the air. He reaches the general conclusions:

A. The outbreak of grain rust is due (a) in the first place to germs of disease in the host plant itself, which in certain cases are inherited from the parent plant through the seed, and in which they lead a latent symbiotic life as a mycoplasma and continue to do so afterwards for a long time in the resulting plant, and (b) in the second place to external infection from the vicinity.

B. The intensity of grain rust is due (a) in the first place to the degree with which the dominant outer circumstances (weather, soil, manuring, and so forth) are able to convert the inner germs of disease from the latent stage of a mycoplasma into a visible stage of mycelium, and (b) in the second place to the accession of infective material from without.

These conclusions have been so recently announced that I am

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[1] Tubeuf and Smith: "Diseases of Plants," p. 82.

[2] "Diseases of Trees." Eng. trans., p. 16.

[3] "Swedish Researches into Grain Rust," "Bot. Gaz." **25**: 37, 1898.

unable yet to realize their full magnitude. That one kind of protoplasm may live in such close association with another kind as to be indistinguishable from the second kind, and then later on assume an independent existence, has not been suggested heretofore. If no mistake has been made these conclusions must lead to still greater advances in the knowledge of plants, and especially of the relations of parasitic fungi to higher plants. Eriksson points out "that they provide a new explanation for the varying susceptibility of different varieties of cereals, and also that we are warranted in suggesting that the predisposition of Hosford wheat to yellow rust may be explained by assuming that between this variety of wheat and the yellow rust an extremely vital mycoplasma-symbiosis is to be found, while, on the contrary, the Squarehead wheat is nearly exempt from the rust for the reason that no such symbiosis has arisen between this wheat and the fungus." They certainly indicate that seeds from plants affected with rust should not be used for propagation.

Discussion.

Benjamin P. Ware said that he and other farmers are interested particularly in club-footed cabbage. The lecturer had told us that spores may remain several years in the ground, and that they are particularly liable to attack one variety. He knew of a farm where there was a luxuriant growth of mustard sixty years ago. It would seem impossible to raise cabbages there if fungus was present, but it was not. Cabbage club foot must be new. It is a modern introduction. It is said that every variety of vegetable is subject to thirty different diseases.

Professor Burt replied that club root is an old disease, having been known more than one hundred years. Old Scottish records describe the disease. The original home of the disease is not known; it is distributed all over the world. The field of charlock may not have had the disease introduced there. A valley near Mount Mansfield, Vt., was so infected that the cabbage could not be grown there. On looking into its introduction there it was found that some one near Boston had sent infected plants there. The gardens are now full of it. The presence of the disease in cruciferous weeds carries the disease over from year to year.

Thomas Harrison asked whether the continuous cultivation of the soil with a cabbage crop is productive of the fungous disease.

Professor Burt said that it tends to perpetuate the fungus. The accumulation of the spores causes serious trouble in following years. There is no time to give the spores a chance to die out.

Mr. Harrison noted that the rotation of crops was recommended, and asked if the crops destroy the fungi.

Professor Burt replied that a fungus is liable to find only a few kinds of plants on which it lives. If a long rotation is practised and no cruciferous crop grown for several years the ground becomes free from the spores of the club-root fungus. The spores germinate and are destroyed. The crops of rotation must be such as will starve the fungus. With the cabbage a rotation of beet and turnip would continue the disease.

Mr. Harrison asked why there is no club root in certain parts of New Jersey.

Professor Burt said that limestone soils are found to give exemption from the disease. The same is found on Long Island, where oyster shells are used.

Samuel Hartwell said that manure will produce the disease, and that he should think that air-slaked lime would help, and asked whether we could thus plant cabbages with success.

Professor Burt said that lime kills the fungi in the ground, and is a fungicide for spores.

Mr. Harrison said that the wallflower is subject to club root.

Professor Burt replied that it is closely related to the cabbage.

On motion of William C. Strong, a vote of thanks to the speaker was unanimously passed.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 26, 1898.

A meeting for Lecture and Discussion was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

The following lecture, which was illustrated with many lantern slides, was given:

SOME NATIVE FERNS OF NEW ENGLAND.

By HENRY L. CLAPP, Roxbury.

Many a person has a pleasant circle of friends living in different places and under different conditions: some in cities, others in

the country; some in highlands on aristocratic streets, others in lowlands on plebeian roads; but as he takes up his collection of photographs of these friends, and looks at each one in turn, what pictures with all their natural colors and movements flash upon the screen of memory! Dress, manner, distinguishing characteristics, and the individuality, atmosphere, and environment of each home come thronging upon his mental vitascope. It may be winter, and summer vacation scenes come almost unbidden; or it may be summer, and visions of autumn rambles and winter studies come back to him. These beautiful, instructive, it may be laborious experiences are the best part of life; they bridge over the rough and sad places; they kindle the imagination in anticipation of happier and more useful seasons in the future.

The fern gatherer also has his circle of friends in Nature's devious ways, and like his human friends these silent acquaintances have their family and given names, their selected places of abode, their distinctive dress and habits, their inherited traits, and their destiny to fulfil. It may be that they are to be buried, as in ages past, to be exhumed in the form of coal to minister to the comfort of man's body as they now minister to the happiness of his mind. As a part of his herbarium they may serve every winter to call up a delightful panorama of mountains and meadows, fields and woods, with all the color and movement of human life associated with it. It may be that as we look at their photographic representations today we shall be carried back in memory to delightful rambles and absorbing studies. But beyond that is the hope that some listener, some looker-on, may be moved to seek acquaintance with those graceful plant forms which we call ferns, and thereby experience a measure of that quiet happiness which such men as Gray, Eaton, Davenport, and Underwood have known.

Scope of this Hour's Work. — This illustrated talk is intended especially to help those who have made some progress in the study of our common native ferns. Necessarily the ground covered will be entirely familiar to those who have studied ferns to a considerable extent. Such must not expect to hear anything new. However, the hundred and thirty slides to be shown will be new, and, it is hoped, interesting and instructive. Without attempting to cover the whole field of our common ferns, or giving a complete botanical description of a single species, we can consider

some of their most prominent characteristics and the most interesting phases in their life history. Only such marked characteristics will be mentioned as would be noticed by one well acquainted with ferns in their homes. Minor details can be found in any good book on systematic botany.

A Few Technical Terms. — We cannot talk about ferns with profit unless we use the appropriate language, including those precise and expressive words which are called technical. But words alone, without antecedent experience on the part of the hearer, convey no meaning, call up no pictures, and make no impression. Names are best explained by the real objects to which the names belong; wanting the real things, their photographic representations, especially those on a large scale, will serve to make clear the meaning of terms.

That part of a fern which is above ground, including the green leaf-like blade and its stem, is called a *frond;* the stem in fern language is called the *stipe;* and its continuation through the flat green blade is the *rachis.* The separate leaf-like parts extending right and left from the rachis are *pinnæ*, the plural of the Latin word *pinna*, meaning a *feather.*

Many pinnæ and some fronds resemble a loose sort of feather. If the pinnæ are divided into separate divisions, as in the case of the Spiny Shield-fern, *Aspidium spinulosum*, such divisions are called *pinnules* (little feathers). If the frond has no pinnæ, but is shaped like a plantain leaf, for example, it is *entire;* if it has pinnæ that are not cut into separate divisions the frond is *once pinnate;* if the pinnæ are cut into separate divisions it is *bi-pinnate;* if the pinnules are similarly cut it is *thrice pinnate.*

Sori, or Fruit Dots. — On the under side of many common fern fronds there are fruit dots or *sori*, as they are technically called. They consist of bunches of spore cases, or *sporangia.* Sometimes they have coverings called *indusia*, which are of many different shapes. A single *sporangium* contains innumerable minute dust-like bodies called *spores*, which under favorable conditions develop into minute vegetable forms called *prothalli.* A cross-section of a sorus illustrated on a large scale will indicate the relative positions of the spores, sporangia, and indusium, which make up a *sorus.*

The Great Aspidium Family. — Members of the Aspidium family have been taken to illustrate the characteristic and minute parts of ferns, because they are so common that in almost any open un-

cultivated place one may find specimens enough for the identification of the family. In this family the indusium is shaped like a circular shield, for which the Greek word is *aspidion*. This word gives the family name, *Aspidium*. The given or specific names like *spinulosum* (full of spines), *cristatum* (crested), *marginale* (marginal), and many others, are still more significant, as John Smith is more significant than Smith alone. This Aspidium family, then, is distinguished by circular badges, family buttons, or coats of arms, as they might be called.

The Sword Fern. — A little difference in the shape of the indusium is the reason for the name of another family, that of the Sword Fern, the commonest fern of the household. The botanical name, *Nephrolepis exaltata*, is very significant. *Nephros* means *kidney*, and *lepis*, *scale*. The indusium is a kidney-shaped scale. The frond is upright and exalted; hence the name *exaltata*. The drooping habit, which the florists in and around Boston have had so much to do in forming, has led Mr. Davenport to give to the fern of that form the additional name, var. *Bostoniensis*.

Life History of Ferns. — With these brief references to the essential parts of ferns and the significance of their names we are in a measure ready to consider their life history, which in its early part is especially interesting, because it is so different from that of flowering plants, such as the corn, the bean, and the rose.

For instance, in the reproduction of a bean plant from a bean the process is direct; that is, what we call a bean is a complete embryo plant wrapped up with its earliest food in a covering, and under the combined influences of heat, light, and moisture it simply unfolds; there is one development, one step. On the contrary, a fern spore, which is often improperly called a seed, does not produce a young fern directly, but first gives rise to an intermediate form called a *prothallus*, a minute, heart-shaped, leaf-like body that has male organs called *antheridia* on the lower part underneath, and female organs called *archegonia* on the upper part near the sinus. The young fern is a product of this prothallus, and an indirect product of the spore. There are two steps in the process — two developments: first, the prothallus from the spore, and then the true fern from the prothallus. Certainly ferns are appropriately called cryptogamous plants, on account of this obscure mode of reproduction.

There are ferns whose sori, so far as form goes, might easily be

taken for flowers. Take, for example, the sori of *Schizocœna Brunonis*, a fern native to the East Indies. The indusium is divided into six petaloid forms, which come from under the sporangia instead of covering them from above, as indusia commonly do. The sporangia resemble the achenia, or seed-vessels, of some members of the Crowfoot family. Indeed, so far as the form is concerned, these sori might be taken for small buttercups, the divisions of the indusia representing sepals and the sporangia, achenia.

Distribution of Spores. — Let us consider the curious means by which spores find themselves in favorable conditions for the production of prothalli — how they escape from the spore cases and reach the earth where their work is to be started.

The sporangia, or spore cases, of the Christmas Fern, *Aspidium acrostichoides*, under favorable conditions will illustrate how spores are thrown from the cases. One important part of the sporangium consists in the annulus, or ring, on the outside. In drying, this ring contracts, ruptures the fragile walls of the sporangium straight across, and bends backward, sometimes so far that one end of the ring meets the other end, carrying the spores on the ruptured walls backward at the same time. Then it suddenly springs violently forward, throwing the spores away, and returns to its former position. If the ring is wet and dried a number of times the action is repeated as often, so that between sunshine and showers the spores are pretty effectually scattered, and the ring is worn out with hard work.

I took an Aspidium frond from the press in a warm summer evening and placed it on the table near a study lamp to examine the sori. I had scarcely adjusted the magnifying glass when I saw a violent commotion among the sporangia. They curled, twisted, snapped, and seemed to be batting each other vigorously. The moisture in them had not been entirely dried out while they lay in the press; but the heat of the lamp combined with the warm atmosphere of the room quickly dissipated moisture enough to produce the actions mentioned. A teacher who was inclined to doubt my statement of what I saw, afterward observed similar motions while holding fruit dots in her hand. Professor Atkinson, of Cornell University, by moistening sporangia with water and drying them over an alcohol flame, caused violent action to take place in sporangia from eighteen to twenty years old.

The spores of the Flowering Fern, *Osmunda regalis*, are dispersed by the springing of the two parts of the sporangium, the spores being thrown in two directions. Among flowering plants a great many similar springing contrivances have been observed. Examples of such are seen in jewel-weed, witch-hazel, violet, cranes-bill, storks-bill, wood sorrel, and other plants.

Crosiers. — One who can name plants only when they are in blossom is not much of a botanist; but if he has studied plants in their homes and can name them as soon as they appear above ground in spring, and can distinguish them by their leaves merely, he can claim to know them well. So one who has studied ferns in their homes from the start can distinguish genera and species by the crosiers as soon as they rise from the ground in spring. The *crosier* is a young fern frond rolled up as a strip of carpet is. It takes its name from its resemblance, when partly unrolled, to a bishop's staff, which is sometimes called a crosier. Its head is curved in the form of a shepherd's crook. The fern crosier in spring simply unrolls and grows in every part at the same time, developing somewhat like a bud and somewhat like a bean plant from a bean.

Many buds, as those of the horse-chestnut and the poplar, for example, have the tender parts protected by a substance resembling fur. In a similar manner the young and tender crosiers of some ferns are protected, some by wool and some by chaffy scales, usually of a brown color. Crosiers, like buds, are made up in the fall, and in early spring may be found grouped in a circular form called a *crown*. The crown of *Aspidium marginale* is usually very conspicuous, and is covered with dark brown scales. The Christmas Fern has a white satiny fur; the Cinnamon Fern, *Osmunda cinnamomea*, a brownish wool; Clayton's Fern, *Osmunda Claytoniana*, a white wool. The Royal Fern, *Osmunda regalis*, also has crosiers protected by white wool, but its slender lake-red stems or stipes serve to distinguish it from any other common fern in this region at an early stage of growth.

The crosiers of many ferns do not have the means of protection referred to, as in the case of the Lady Fern, for example. The coiled-up form seems to serve the purpose of protection sufficiently well.

To the unobservant or uninterested person crosiers look very

much alike, but the more one studies them in their homes the more obvious their differences become.

Dissimilarity of Fronds.—To carry on the life history of ferns farther, another step must be taken, and that is the development of crosiers into fronds. Fronds especially show very marked differences, although they too have been declared to "look all alike." We will now compare a few fronds unlike in shape.

Clayton's Fern, *Osmunda Claytoniana*, bears but little resemblance to the Royal Fern, *Osmunda regalis*. Its fruit is on pinnæ, from two to five pairs, midway of the frond; and, since these fertile pinnæ make a break in the sterile pinnæ, the fern is sometimes called the Interrupted Fern. The foliate parts of the Royal Fern resemble the leaves of a shrub more than those of any other fern in this region. The fruit is on long stems branching out at the top of the frond.

The Christmas Fern, *Aspidium acrostichoides*, is sword-shaped in outline. It has pinnæ, but no pinnules, and the sori are on the upper pinnæ, which are narrower than the sterile pinnæ. The Oak Fern, *Phegopteris Dryopteris*, is ternate, or in three well-defined parts, each part being more or less triangular in form. The Beech Fern, *Phegopteris polypodioides*, has the form of an arrowhead, and the two lower pinnæ are deflexed or bent downward and forward. The Maiden-hair Fern, *Adiantum pedatum*, bends around somewhat in the form of a horse-shoe. Surely these fronds do not resemble one another. There are some that do, which will be mentioned later, when one more stage in their life history has been noticed.

Basis of Classification. — Notwithstanding the great diversity of forms in fern fronds, the basis of classification is generally found in the composition, position, shape, and size of the sori. The mode of veining and the rootstalk are also important. The principal forms of sori are circular, stitch-shaped, straight and curved, cup-shaped, globular, and marginal — the last when the edge of some part of the frond is turned over so as to make a sort of hem for the protection of the spore cases. A comparison of the sori on the pinnæ of several species of our native ferns will illustrate the importance of sori as a basis of classification. Take, for illustration, a pinna each of *Aspidium marginale*, *Asplenium thelypteroides*, and *Dicksonia pilosiuscula*. The first has elevated sori, with shield-shaped indusia on the margin of the lobes of the pinna;

the second has straight stitch-shaped sori at an angle with the midrib of the lobe; and the third has cup-shaped sori in the sinuses of the pinnules. Each of these species is put in a different genus from the others by reason of the differences in their sori.

Members of the Aspidium Family. — Keeping in mind that the Aspidium family is distinguished by indusia resembling circular badges or shields, we will notice the main characteristics of the species common in this region.

First in frequency comes the Mountain Fern, *Aspidium Noveboracense*. The fronds taper both ways from the upper middle part, the lower pinnæ gradually growing farther apart and smaller. This is so marked a characteristic that to distinguish the fern no other is really necessary. No other common fern has this characteristic. The sori are minute, and unless they are in just the right stage of development the glandular indusia are hard to make out. This fern grows on rocky, wooded hillsides and mountains. In color it is light yellowish-green — so light as to take almost white with the ordinary photographic plate, with which both yellow and green commonly take black. When the sunbeams come through the openings in the foliage of the trees and strike on these light-reflecting fronds the effect is unusually brilliant. They are delicate in structure and tender in constitution, passing away at the first approach of cold weather.

The Meadow Fern, *Aspidium Thelypteris*, is very common in moist woods and low land bordering on woods. The pinnæ commonly make a right angle with the rachis, and the lowest are but little smaller than the largest on the frond, and, therefore, it need not be mistaken for the Mountain Fern just described. The fertile frond looks quite different from the sterile frond. The margins of the lobes are strongly revolute, or rolled over so much as to make the lobes look narrow and acute. This contraction of lobes or pinnæ in fertile fronds is found in other species to be noticed later. If the frond is taken at the right season the circular indusia and the beginning of the curvature in the margins of the lobes may be seen plainly.

A very interesting fern, called by Mr. Davenport *Aspidium simulatum*, shows resemblances to both the Mountain Fern and the Meadow Fern. It has the shape of the Meadow Fern, but its sori are larger and its indusia are glandular, while the indusia of the Meadow Fern are not glandular. It is like the Mountain

Fern in respect to the glandular indusia and pubescent midribs, but is distinguished from it by its larger sori and Thelypteris-like fronds. Mr. Davenport says that it is somewhat later than its congeners, and prefers cool, swampy woodlands, and that he has called it *simulatum*, "on account of its remarkable simulation of a narrow woodland form of *Asplenium Filix-fœmina*, which almost invariably has conduplicate pinnæ when growing in the sun."

The Spiny Shield Fern, *Aspidium spinulosum*, takes its specific name from the sharp points or spines ending the numerous lobes of the pinnules. *Spinulosum* (full of spines) is, therefore, a very significant name. The pinnæ are commonly set on the rachis at an angle varying from forty-five degrees to sixty degrees, the lower ones being broadly triangular in shape. The basal pinnules on the lowest pair of pinnæ are the longest, and they suggest bowknots with the ends slanting downward. This prominent characteristic will nearly always be sufficient for the identification of the fern. The pinnules are set obliquely on the midrib, and the indusia have no glands. The frond is oftenest twice pinnate, commonly light yellowish-green, somewhat coarse in texture, and deeply veined on the upper side. It is an evergreen, and grows in partly shaded places near rocks.

This type form of *spinulosum* has been described somewhat carefully for the reason that it is likely at first to be confounded with its more common variety, *Aspidium spinulosum* var. *intermedium*. Nevertheless they are unlike in almost every feature that has been mentioned. To be sure, the lobes of the pinnules of the variety *intermedium* have spines, and the outline is somewhat like that of the type. There the resemblance ends. The pinnæ are set on the rachis at an angle varying from sixty degrees at the top of the blade to ninety degrees at the bottom. The largest pinnules on the lowest pair of pinnæ are not the basal ones, but next to them, and there is no suggestion of a bowknot. The pinnules are nearly at right angles with the midrib, and the indusia have glands, which can be seen best just before the indusia begin to shrivel. Indeed, the indusia pass away so soon that the sori appear naked. The frond is oftenest thrice pinnate, very dark green, fine and lace-like in texture, and loves the deepest shade. Seldom have I found it outside of dense, dark woods. When this description is compared with that of the typical *spinulosum* not much resemblance will be seen.

The next variety of *Aspidium spinulosum* is *dilatatum*, easily distinguished by its great breadth and thrice-pinnate divisions; that is, the pinnules are divided to the midrib. The type form is only twice pinnate.

The Crested Shield Fern, *Aspidium cristatum*, is one of the most beautiful of our native ferns. The frond is linear-oblong or lanceolate in outline and twice pinnate; the pinnæ are short, thick, and triangular, and the flat sori are larger than those of any other member of the family in our region. This fern is an evergreen, not very common, and bears transplanting well.

Aspidium Boottii, though now recognized as a distinct species, was formerly considered a cross between *A. cristatum* and *A. spinulosum* var. *intermedium*. It resembles *A. cristatum* in its general shape, erect habit of growth, and triangular lower pinnæ. It is like var. *intermedium* in regard to its thrice-pinnate divisions, thin texture, glandular indusia, dark green color, and spinulose-toothed pinnules set on the midrib nearly at right angles with it. It is much taller than either *cristatum* or *intermedium*. The fact that the spores are sterile is strong evidence of its being a cross. It is a rare fern, probably on account of its sterility.

Aspidium marginale is one of our most attractive evergreen ferns. The frond is graceful, but firm in texture; the upper surface is noticeably bluish-green, and the under surface very gray. The pinnæ taper to long points and curve upward, and the pinnules bear on their margins elevated sori resembling apple tarts. Indeed, they are so high that when placed in the sun they cast long shadows on the pinnules. The shield-shaped sori being situated on the margins of the pinnules, the name *Aspidium marginale* is most appropriate. Its thick, leathery texture qualifies it for an evergreen, and this, added to the fact that it is easy to raise, makes it a fern of the first quality for the fernery. It has been growing vigorously for seven years in the George Putnam School Garden. The chaffy brown scales that cover the undeveloped crosiers in early spring persist on the stipes when the fronds are fully developed.

A fern that partakes of the characteristics of both *Aspidium cristatum* and *Aspidium marginale* was discovered in 1880 by Raynal Dodge, of Newburyport. Mr. Davenport has raised and studied it for three or four years, and with the best of reasons has declared it to be a cross between the species named above. The upper part of the frond is exactly like that of *A. marginale*, while

the lower part is like that of *A. cristatum*. Moreover, the root-stock is erect like that of *A. marginale*, while the texture and venation are like those of *A. cristatum*. Again, the crosiers being thickly covered with light brown scales, and the indusia being convex, it is like *A. marginale*.

If so well-marked a species can be found in a region supposed to be thoroughly searched, other hybrids, varieties, or even species, may be discovered by some diligent observer.

The native evergreen fern that holds the first place is the Christmas Fern, *Aspidium acrostichoides*. It is sword-shaped in outline, thick and leathery in texture, glossy dark green in color, and produces its sori on the contracted upper pinnæ, though the tips of the lower pinnæ sometimes have sori. The pinnæ are generally entire, slightly toothed and scythe-shaped, and at the base on the upper side have a decided heel; but in the variety *incisum* the pinnæ are cut into pointed lobes. This variety seems to be permanent, since one in the George Putnam School fernery has shown the characteristic marks for four or five years without intermission. The Christmas Fern grows in well-shaded places, and when the fronds come up through the snow in the woods the glossy, dark green clumps are in striking contrast with the white snow. In Canada especially it often grows in immense clumps. The crosiers are covered with a silky white glistening coat, and are the most fantastic, not to say decorative, looking crosiers that I have seen.

The Asplenium Family. — Next in importance to the Aspidium family is the Asplenium family, and the member seen most frequently is the Lady Fern, *A. Filix-fœmina*. One can hardly say where it does not grow, it is so common. It may be distinguished easily by its fruit dots, which sometimes are straight and sometimes curved like a horse-shoe, and soon run together, forming dense dusty brown patches on the under side of the pinnules. The frond when growing in the shade is ovate lanceolate, but in places exposed to the sun it changes its form so much as to appear to be a different species. In the latter case the pinnæ curve upward in a vertical direction, and the pinnules stand back to back as if to repel all hostile forces in the form of wind, cold, rain, and the heat of the sun. Professor D. C. Eaton called this form var. *angustum*.

The fern puts itself in this attitude to protect itself from the

too intense rays of the sun, which cause too rapid transpiration of moisture from the foliage. It often grows by the side of roads on dry gravelly banks where there is but little moisture, and if by reason of a hot sun there is too rapid transpiration of moisture from the foliage the roots cannot take up enough to supply its place, and the frond wilts and perhaps dies. Other ferns have the habit of drawing their parts together for protective purposes, as, for example, the Flowering Ferns, which will be considered later.

The most striking illustrations of this habit of taking a protective position are found in the so-called Compass Plants, *Lactuca Scariola*, which grows in Europe, and *Silphium laciniatum*, a Western plant. Their broad surfaces face the east and west points, while the edges of the leaves extend north and south. So constant is this habit that in former years hunters and travellers were accustomed to be guided by the position of the Silphium leaves in their wanderings over the trackless prairies.

Probably there are more varieties of the Lady Fern than of any other fern on the earth. Many of them have been found growing wild, but by far the larger number have been produced by sowing varieties of spores together. In England, Lowe, Moore, and Clapham, especially, have spent a large part of their lives in producing such varieties. Mr. Lowe, during a period of fifty years, has produced at least four hundred varieties of the Lady Fern, some of which are very remarkable. By looking at the type form again we can better appreciate the remarkable changes in form to be seen in the varieties. The variety *corymbiferum* presents an extraordinary example of pinnæ forking at the ends again and again, until the end of every pinna becomes fan-shaped or takes the form of a corymb, whence the name *corymbiferum* (bearing corymbs). This variety was found growing wild on the Island of Guernsey, one of the Channel Islands. The variety *acrocladon*, found growing wild near Howard Castle, England, by Mr. Clapham, shows still more remarkable variations from the type form. It takes an arborescent form and resembles an elm tree flattened out. The subdivision of the rachis so as to simulate the branching of a tree is unique.

The variety *Fama* was originated by Mr. Lowe. It is quite remarkable for the bifurcation of the rachis and of each pinna. The pinnæ are widely separated and the pinnules are much contracted.

Hebe, another variety originated by Mr. Lowe, shows a stronger tendency to bifurcate, especially at the top and on the lower pinnæ, which are noticeably lax. The bifurcation is repeated, until each of the lower pinnæ terminates in a crest. *Multifidum*, originated by Mr. Lowe, has the pinnæ the usual distance apart, but they are very delicate in form and end in many divisions, whence the name *multifidum* (divided many times). The pinnules are extremely regular in arrangement, and gradually diminish in size to the ends of the pinnæ.

I have noticed some remarkable variations in the fronds of the Lady Fern, besides those in the case of fronds growing in exposed places already referred to. There are various degrees of thickening of the frond at the top and of rolling up so as to form a somewhat compact ball of stunted and misshapen pinnæ and pinnules. So many similar forms in other plants are caused by grubs that these fern balls would seem to be caused in a similar manner, but an examination of many specimens has never been rewarded with the discovery of a single grub. The disposition to thicken and bifurcate at the top in case of perfectly erect fronds, then to bend a little in the case of one frond, and more and more in the case of others, seems to show *the nature of the fern* rather than the presence of grubs.

The crosiers of the Lady Fern are scrawny looking things without wool or scales. The stems are commonly blackish-brown, but often lake-red in color, like those of the Royal Fern, but the absence of wool serves to distinguish them.

Asplenium thelypteroides is not a very common fern, but has interesting characteristics. The pinnæ are remarkably acuminate, or long taper pointed. The sori are stitch-shaped and straight. The indusia at a certain stage of growth resemble light blue silk stitches, and, once seen in their most beautiful condition, will make a lasting impression on the memory of the observer. So far as the sori are concerned this fern is one of our best types of the Asplenium family. It flourishes well under cultivation, and needs but little care.

Flowering Ferns. — The Osmundas are called Flowering Ferns because the fruit appears in the same relative position to the frond in which the flowers and fruit of phænogamous plants appear to their respective plants. Flowering plants usually have their flowers at the top of the leafy stem, like the rose bush, or on a stalk separate from the leaves, like the dandelion.

The Royal Fern, *Osmunda regalis*, has its fruit, which looks like a cluster of flowers, on the top of the leafy stem, which is much branched. The whole arrangement is like that of the pink spiræa cultivated in gardens. The foliage bears no resemblance to that of our common ferns, but is more like that of some flowering plant or tree, like the locust. The pinnules look like the leaves of some shrub. It grows to the height of five feet in this country, but in England, which has a moister climate, it reaches eleven feet, and on account of its height and beauty the name Royal Fern is well bestowed. In the shade the branches, both of foliage and fruit, spread or make wide angles with the rachis; but in exposed places the branches take a position nearly vertical, at the same time drawing pinnules and fruit clusters together. The crosiers are clothed with wool slightly varying from white, and the stems are of a beautiful lake-red color. If various crosiers covered with wool are seen growing together in spring in the same locality those with lake-red stems may be known as Royal Ferns in the process of developing.

Osmunda Claytoniana has the fertile pinnæ midway of the frond, and so is called the Interrupted Fern. The fertile pinnæ differ much in number and mode of fruiting. Sometimes there is only one pair, then one and a half, then two, and so on up to five pairs. The globose sporangia are arranged in circular uncovered bunches on the much contracted pinnules, which are occasionally flat, but commonly dense and cylindrical. This fern also has the habit of spreading its pinnæ when it grows in the shade, and elevating them so as to make a sharp angle with the rachis when growing in the sun. This illustrates another attempt to prevent too rapid transpiration of moisture from the foliage. Magnificent specimens of this fern grow in Hyde Park. It has been grown successfully in the George Putnam School Garden for six or seven years. The crosiers are clothed with nearly white wool, and are as beautiful as any growing in this region.

The blade is often light yellowish-green, especially when young, and droops gracefully, so that there is little need of confounding it with the third species of Osmunda, the Cinnamon Fern, *Osmunda cinnamomea*, which is stiff, erect, and dark green in color, and the pinnæ nearly always make a noticeable angle with the rachis, but in open places the angle is quite sharp. There is a little tuft of brown wool where the pinnæ join the rachis,

which serves to distinguish a frond of the Cinnamon Fern from one of the Interrupted Fern. The fertile fronds are much shorter than the sterile, and soon wither and fall down in a limp, straggling way. As a rule the fruit is on a stalk by itself, and clustered together in the form of a club; but I have found in the same clump many unsuccessful attempts to form fruit. The crosiers are covered with wool slightly cinnamon-colored, and so they are prepared to start from the ground in spring among the very foremost.

The Onocleas. — The Sensitive Fern, *Onoclea sensibilis*, is exceedingly common. Except on high land it grows wherever ferns grow — in woods, open fields, pastures, meadows, and along stone walls. It is not sensitive about the location of its home, provided it is not dry.

Ordinarily the fruit does not appear on a leaf-like form, but on a stalk by itself. It consists of small berry-like forms arranged on stiff, straight branches. These spheroidal forms contain the sporangia, or spore cases. The fertile frond is a much modified form of the broad, unfertile foliate frond. Sometimes the modification is only partly completed on either side of the rachis, and sometimes it is complete on one side and incomplete on the other. In a small area, perhaps thirty feet square, I have found a complete graded series of modifications, from the expanded sterile frond to the complete fertile frond. These imperfectly fruited fronds have been called variety *obtusilobata*, but, since they are very variable and uncertain to appear again in the same place, they do not deserve to be so classed. They are simply unstable variations, such as are seen in the growth of Clayton's Fern and the Cinnamon Fern; but they present a valuable lesson in morphology; they illustrate how seed vessels generally are formed from leaves.

The Sensitive Fern has a most ancient pedigree, having come down to our time, unchanged in form, from a period half a million years back. It is older than the Rocky Mountains or the Himalayas, and is supposed to have come into existence during the Chalk age, before mammals appeared on the earth. Sir William Dawson places it in a later period, the Eocene, and says it is found in great abundance in the Laramie beds in the West.

The Ostrich Fern, *Onoclea Struthiopteris*, is appropriately named, since both the fertile and sterile fronds resemble ostrich feathers. The sterile fronds taper downward in a marked manner,

like those of the Mountain Fern, but the frond is two or three times as large as that of the Mountain Fern, and the lower pinnæ are comparatively near together. The fertile fronds are much shorter than the sterile, and look like silk twist. They suggest a buttonhole, or a piece of embroidery worked with lustrous brown silk. The crosiers are without wool or scales and keep their rolled-up form until the lower pinnæ are well developed, and the frond has attained a considerable height.

This is the giant among our native ferns. In Canada I have found it growing seven feet high. It is entirely hardy and easy of cultivation. One planted in the fernery of the George Putnam School years ago has spread widely and given the pupils many opportunities to observe its development "from start to finish."

The Rock Fern. — The Common Polypody, *Polypodium vulgare*, is often called the Rock Fern, because it is nearly always found growing in a thin layer of loose leaf-mould on rocks. The layer may be two inches thick, and can be readily stripped from the rocks, bringing the fern with it. Planted in ordinary soil away from rocks it languishes and gradually dies out. The term "polypody" means many-footed, and refers to the numerous branches of the rootstock. A characteristic mark of a Polypodium is the absence of indusia in the sori. This characteristic of the Polypodys is well illustrated by *Polypodium aureum*, the Golden Polypody of Florida. This fern grows naturally on the cabbage palmetto, but it is a beautiful fern for house culture, as proved by Mrs. Richards, who has grown it for years. The large, naked sori are remarkable. Other ferns have sori without indusia, but their fronds have not the shape of Polypodium fronds.

Beech Ferns. — We have three species of *Phegopteris* whose sori have no indusia. The first is *Phegopteris polypodioides*, whose fronds are triangular in outline, or shaped like an arrowhead. The lowest pair of pinnæ are deflexed and stand forward. These marks will serve to distinguish the species from all others. The sori are small, naked, and situated near the margins of the lobes of the pinnæ. This fern grows in bushes and woods of various kinds, and in great profusion in Northern New England and Canada.

Phegopteris hexagonoptera is closely allied to the species just mentioned, but it is relatively much broader — in fact, broader than it is long. It is not one of the common ferns, nor is it especially rare; but it is common southward.

The Oak Fern, *Phegopteris Dryopteris*, has three well-marked divisions which are more or less triangular in shape. It is a small fern, averaging six or eight inches in height. There seems to be no special reason why it should be called the Oak Fern, since it commonly grows in any kind of woods, — pine, maple, and birch, as well as oak and beech.

The Maiden-hair Fern. — Although many species of Maiden-hair Fern are cultivated in this region, and many have been exhibited in Horticultural Hall at intervals for many years, there is only one native species growing in New England, and that is *Adiantum pedatum*, a very graceful and beautiful fern. It has not been my good fortune to see much of it in Massachusetts, but in the Province of Quebec I have seen it growing over large areas. It grows in moist woods, and has the peculiar property of repelling rain or moisture from its foliage, as the jewel-weed does; hence the name Adiantum, which means *unwetted*. The stipes are black and shining and the sori are marginal, the margins of the lobes being reflexed to form indusia. I have raised the fern in several places, but it does not flourish well for a number of years.

Bladder Ferns. — The Bladder Fern takes its name from the inflated indusia of the sori. There are two common species; but they are not as common about here as most of the ferns already mentioned. In the Province of Quebec they are found in luxuriant abundance. The narrow drooping fronds of *Cystopteris bulbifera*, the Bulb-bearing Bladder Fern, are often three feet long, although the length, as given by Gray and Underwood, is from one to two feet. This fern is peculiar from the fact that besides sori it bears small bulbs, about as large as a small pea, on the under side of the rachis. New ferns grow from these bulbs, thus simulating the one-step development of flowering plants. The little bulbs are ferns in embryo, and they fall to the ground and there take root in the same manner as the axillary bulbs of the tiger lily do.

The Fragile Bladder Fern, *Cystopteris fragilis*, is a small species, rarely exceeding eight inches in length. It commonly grows in densely shaded spots in the crevices of rocks. The fruit dots are small, and the bladder-shaped indusia are circular at one end and pointed at the other. It matures early, being out of good condition by August. I have raised it without difficulty five or six years, though it does not increase.

The Woodsia. — Another little fern which loves the crevices of rocks is *Woodsia Ilvensis.* It often grows in exposed places, but manages to keep comfortable by growing in dense clumps and covering itself with thick brown bristles. I have seen it growing in the greatest abundance in Canada, but it is also common in New England. The sori of Woodsia are generally peculiar from having the indusia in long ribbon-like strips coming from under the sporangia, instead of being over them, as is commonly the case.

The Walking-leaf Fern. — The *Camptosorus rhizophyllus*, or Walking-Leaf, according to Gray is found from west New England to Wisconsin and southward. I have found it abundant on lime rocks in the latitude of Quebec. The generic name *Camptosorus* means *bent sorus*, referring to the curved sori; the specific name, *rhizophyllus*, means *leaf-rooted.* The fronds have long tapering points which bend down to the earth and take root in the manner of a strawberry runner. The process is repeated, and thus the rooting leaves or fronds seem to walk over the ground, but at an exceedingly slow pace.

Dickson's Fern. — The last fern to be noticed is the very common *Dicksonia pilosiuscula*, named for James Dickson, an English fernologist. It is the most delicate and lace-like fern that we have. I used to confound it with the Lady Fern if I saw it at a distance, but one look at the sori, which are very small, cup-shaped, and situated in the sinuses of the pinnæ, served to distinguish it from the Lady Fern, which has conspicuous curved sori. There are many species of *Dicksonia* in other parts of the world, but we have only this one.

Fern Localities. — High Falls in the Province of Quebec is a place remarkable for ferns. Coming this way almost to the Vermont line, on the South-eastern Railway, we find the little village of Glen Sutton, or "The Glen" as it is commonly called by the people of the vicinity. It is situated in a beautiful valley surrounded by mountains, from whose sides run many small perennial streams which have cut deep channels for themselves in the rocky declivities. The sides of these channels are wonderfully rich in ferns of nearly every common species. It was here that Edson, one of the best artists in Montreal, used to come to paint. It is no discredit to the comfortable hotel or the boarders to state that board is two dollars and half a week. Still farther this way, just over the line, in New Hampshire, is Colebrook, whose mountains are wonderfully rich in ferns.

Another beautiful place abounding in ferns is Bridgton, Me., which is on a chain of beautiful lakes, one of which, Highland Lake, resembles Lake George. On the very edge of this lake are fine groves abounding in ferns. Within an area one hundred feet square were a dozen species growing luxuriantly. Going by the path through the opening on the other side into the field a few rods, I found the numerous variations of the Sensitive Fern. A little farther on by the side of the road the variations of the Lady Fern were gathered; and a little farther away on the other side of the same road the variations of the Cinnamon Fern grew.

Here the consideration of ferns today closes; but if any listener wishes to become acquainted with ferns to almost any extent he should become a member of the Massachusetts Horticultural Society. Here he will always find help from competent botanists, sumptuous books, and the fine collection of pressed ferns presented to the Society by Mr. Davenport.

BUSINESS MEETING.

SATURDAY, April 2, 1898.

A duly notified Stated Meeting was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

The President submitted to the meeting the following amendment to the Constitution and By-Laws, which was read twice and by a majority vote ordered to be entered on the records for consideration at the Stated Meeting on the first Saturday in July:

SECTION XVII, A.

COMMITTEE ON FORESTRY AND ROADSIDE IMPROVEMENT.

A Committee on Forestry and Roadside Improvement, of five members, shall give special attention to the subject of the preservation and improvement of the woodlands of Massachusetts; shall lend its assistance, so far as possible, to securing the planting of trees, and the preservation of those already planted, upon the borders of the highways of the Commonwealth; shall secure, so far as shall seem to it expedient, the enforcement of the laws of the Commonwealth relative to forests and trees; shall, with the approval of the Society, petition the Legislature for such changes in and additions to the laws as shall make them more

efficient; shall submit to the Committee on Lectures and Publication plans for lectures, essays, and discussions on forestry subjects; and shall have authority, with the approval of the Executive Committee, to offer prizes for written contributions to forestry knowledge, not exceeding the amount which the Society may have placed at its disposal.

The President appointed as the Committee on School Gardens, School Herbariums, and Children's Herbariums the following-named members:

Henry L. Clapp, *Chairman.*

Mrs. H. L. T. Wolcott,	Mrs. P. D. Richards,
George E. Davenport,	William P. Rich,
Miss Katharine W. Huston,	W. E. C. Rich, *Secretary.*

The President announced that James H. Bowditch would be unable to serve on the Special Committee on Forestry, and that he had appointed J. Woodward Manning in his place.

William H. Spooner announced the decease of Hon. John Simpkins, and moved that a Committee be appointed by the Chair to prepare a memorial of him. The motion was carried, and the Chair appointed as that Committee Professor Charles S. Sargent, Ex-President William H. Spooner, and Professor Benjamin M. Watson.

Joseph H. Woodford made a similar motion in regard to Fearing Burr, who died on the fourth of October, 1897. This motion also was carried and the Chair appointed as the Committee George Lincoln, Edmund Hersey, and Starkes Whiton.

The Secretary announced the receipt of a letter from Mrs. Sophia E. Copeland, acknowledging the receipt of the memorial of her brother, Edward C. R. Walker, and expressing her appreciation of the sympathy of the Society.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

George M. Morgan, of Boston,
George H. Sutherland, of Roslindale,
Harlan P. Kelsey, of Boston.

Adjourned to Saturday, May 7.

MEETING FOR LECTURE AND DISCUSSION.

THURSDAY, April 21, 1898.

A lecture was delivered this evening, in the Society's Hall, before the Massachusetts Horticultural Society and the Appalachian Mountain Club, FRANCIS H. APPLETON, President of the former Society, in the chair. President Appleton welcomed the Appalachian Club to the Hall, and introductory remarks were also made by Professor William H. Niles, President of the Appalachian Club.

The following is an abstract of the botanical part of the lecture:

THE WILD FLOWERS OF THE CANADIAN ROCKIES AMIDST THEIR NATIVE SURROUNDINGS.

By CORNELIUS VAN BRUNT, of New York.

A trip over the Canadian Pacific Railway, from Montreal to Vancouver, is one of the most delightful to be imagined; and the variety of the scenery and the beauty and novelty of the flora make one's enjoyment increase each day. Last year we took this trip, going in the early part of July and returning the first of September, that we might photograph the flowers then in bloom. East of Lake Superior the flora was mostly familiar to us. Farther west, on the prairies, the flowers were especially brilliant and beautiful.

Banff was our first stopping-place. After the beautiful mountain scenery the thing that most impresses the stranger is the abundance and brilliancy of the flowers and their habit of growing in large communities, as it were. A hill blue with bluebells, a swamp vivid scarlet with painted cup or brilliant magenta with fireweed, are the rule, not the exception. The most striking novelty about the Banff Hotel early in July is the *Zygadenus elegans*, of the lily family, a beautiful white flower growing in great abundance on swampy ground. A swamp near the hotel, which had, earlier in the season, been filled with lady's-slippers, habenarias, arethusas, and other orchids, now showed myriad specimens of *Tofieldia glutinosa*, the parnassia, senecio, campanula, castilleia, and potentilla. *Potentilla fruticosa* might at a first glance be mistaken for a wild yellow rose, so large are both the bush and the flowers. The wild rose of that locality — *Rosa*

acicularis var. *Bourgeauiana* — was about through its blooming season. It had covered large areas and must have been very beautiful. Blue clovers, instead of red, white, or yellow, were also a novelty to us. The color of one of these, *Astragalus adsurgens*, varied from bright blue to purple and violet, and was most effective. Other plants resembling blue clover were *Astragalus hypoglottis*, *Oxytropis viscida*, and, most beautiful of all, *O. splendens*, a superb rose-purple head and leaves resembling silvery colored velvet.

In July the Leguminosæ seemed the best represented family. There was the beautiful rose-purple of the *Vicia truncata*, which twines about everything, white and pink *Hedysarum boreale*, *Oxytropis Lambertii*, both white and pink, the graceful and very fragrant *Lathyrus ochroleucus*, with cream-colored flowers and trailing habit, and the brilliant magenta *Hedysarum Mackenzii* — these are a few members of the Pea family in bloom during July. *Phaca Americana* was in seed, but almost as handsome as when in flower. A superb blue vetch, which has not yet been identified, grew in masses on the shore at the junction of the Bow and Spray rivers. Under the coniferous trees near Banff the ground is fairly carpeted with *Linnæa borealis*. With it were the dwarf cornel, the one-flowered pyrola (*Moneses grandiflora*), and also *Pyrola secunda*, *P. chlorantha*, and *P. rotundifolia*. These grew in dry places, but in wet, shady spots the pink pyrola (*P. uliginosa*) was abundant. With it we found *Pinguicula vulgaris* and the delicate unobtrusive brown lily (*Stenanthium occidentale*), which has a delicious fragrance.

The Bow River Valley, through a glass, looked as yellow as gold, and we found that the hue was due to the abundance of *Gaillardia aristata*, which resembles our *Rudbeckia hirta*, though it is more brilliant.

A most noticeable shrub is *Shepherdia Canadensis*, with its vivid scarlet or translucent yellow berries. *Allium cernuum* and its more noticeable relative, *A. Sibiricum*, cover large patches of dry hillside. In shady, moist nooks *Parnassia palustris* had taken a strong foothold, and a little later in the season the more beautiful *P. fimbriata* appeared.

The season is so short in this latitude that haste is very necessary if the flowers would fulfil their mission in this world; and in consequence they bloom and fade away with the most con-

fusing rapidity. Spring flowers and summer flowers and autumn flowers all bloom together, and in such an energetic fashion that we marvel not only at their vigor, beauty, and abundance, but even more at the apparently intelligent comprehension of the necessity for speed. A showy weed is the strawberry blite (*Chenopodium capitatum*); and the Northern bedstraw, pink yarrow and white, pearly everlasting, and the pink everlasting are abundant in the open woods and along the roadsides. In shady places along streams several purple asters grew thriftily, the most showy being *Aster Fremontii;* and along the wet margins of the Bow River is found *Spiranthes Romanzoffiana* in great abundance and beauty. Great clumps of *Pedicularis Grœnlandica* brighten the banks of the Bow River with long spikes of magenta bloom. The pretty but less showy *Pedicularis bracteosa* is more abundant in wet woods. There are two gentians — the little *Gentiana acuta*, which is a pale lavender, and the sturdy, somewhat coarse *G. Forwoodii*, which is a deep blue, flecked on the corolla lobes with yellow. Along this river also is found that most beautiful flower, the shooting star (*Dodecatheon Meadia*).

Banff owes much of its popularity to the hot sulphur water that issues from Sulphur Mountain. The Government owns many of these springs. The hot overflow from the Government baths, known as the Cave and Basin, makes ponds which do not freeze over in winter, and on their borders are found plants which belong to a different latitude. Among these are the smaller fringed gentian (*Gentiana detonsa*) and *Lobelia Kalmii*, not only blooming ahead of time, but most of them growing in the warm water. One of the excursions to be made from here is to the "Hoodoos," — curious rock formations, — and on a smooth, sandy plateau near by were three kinds of flowers which nearly covered the ground — *Anemone patens* var. *Nuttalliana*, best known as the pasque flower, *Campanula rotundifolia*, and *Hedysarum Mackenzii*. The sandy roadway for a considerable distance was covered with a curious weed of the mustard family, *Physaria didymocarpa*, or bladder-weed. This derives its common name from the seeds being enclosed in woollen bladder-like sacs.

A striking feature of the National Park landscapes is the squirrel or fox-tailed grass, *Hordeum jubatum*. Clumps of it are found almost anywhere, but sometimes it takes possession of considerable areas of level ground, and, waving in the wind on a sunshiny morning, is one of the most beautiful pictures imaginable.

On a drive to Devil's Lake we collected blue flax, larkspurs, red anemone, and *Geum triflorum*. These grew on level spaces a little removed from the road. The roadsides proper were crowded with bluebells, fireweed, golden-rod, *Artemisia frigida*, erigerons, — pink, blue, and purple, — *Spiræa betulæfolia*, troximons, gaillardias, pink, white, blue, and purple peas, pearly everlasting, and pink and white yarrow.

The summits of Sulphur and Tunnel mountains were the abode of many small Alpine plants, mostly saxifrages and heaths.

From Banff to Laggan is but a few miles. The railroad skirts the Bow River, whose banks were brilliant with painted cup, fireweed, and patches of the Western red lily (*Lilium umbellatum*), just out of bloom. The swamps of Lake Louise were covered with beautifully colored sphagnum, and earlier in the season orchids had been abundant. The woods were filled with a great variety of fungi, many of which were brilliantly colored and fantastically shaped. Lichens covered everything available, and the mosses were exquisite and sometimes very curious. Lake Louise is the most beautiful place imaginable, combining mountains, forest, snow, glaciers, water, and sky in such proportions as to make it the perfection of scenery. The forests of coniferous trees, mostly spruces, are dark and dense with long beards of gray moss falling from their lower branches. The forests about Lake Louise have the advantage of having escaped fires. The most characteristic tree of the Canadian Rockies is neither the balsam nor the spruce, but Lyall's larch, which is found nowhere else. This is the last tree before reaching the snow-line. Its needles being deciduous and turning to a bright yellow before falling, a very noticeable band appears in August above the dark foliage of the evergreens.

The plants most noticeable about Lake Louise in August were Labrador tea, the white rhododendron, and *Kalmia glauca*. Cotton-grass covered the glacial meadows at the head of Lake Louise, and here was also *Epilobium latifolium* growing abundantly. *Senecio triangularis* grew on the steep sides of the valley, and was the only species of senecio seen, though at Banff there were several. Here were also seen *Saxifraga Lyallii*, fireweed, yellow columbine (*Aquilegia flavescens*), the blue (*A. brevistyla*), and the red (*A. formosa*).

A pretty little anemone (*A. parviflora*) bloomed almost in the

snow. Still farther up the valley, on the lateral moraine, a flower garden awaited us. Masses of purple pentstemons, the pink moss campion, the night-blooming catchfly, *Dryas Drummondii*, *Castilleia pallida*, small species of potentilla, a dwarf bluebell, and specimens of a large rankly growing yellow thistle covered the steep slope. At Mirror Lake we found *Arnica cordifolia*, brilliant yellow and delightfully fragrant, *Valeriana sitchensis*, and erigerons more beautiful than any we had yet seen. In the woods near Mirror Lake were the lovely pink bells of *Bryanthus empetriformis*, and at the upper lake — Lake Agnes — *Cassiope tetragona* and *C. hexagona*. The last pitch of the climb to Lake Agnes was made beautiful by the Alpine flowers — *Saxifraga bronchialis*, *Sedum stenopetalum*, etc. Castilleia, pentstemons, and columbines were everywhere. All around these lakes, wherever there is moisture enough, is found the most beautiful of all the wild flowers — *Myosotis sylvatica*, the forget-me-not.

Leaving Laggan, we proceeded to Glacier through the most beautiful scenery. Here the trees increased in size, and one would hardly recognize them as the same species that we had seen in the Rockies — Engelmann's spruce, Patton's hemlock, the Douglas fir, the white pine, balsams, and flat cedar. In fact, these were all we had seen in the Rockies, except Lyall's larch. These forests are as difficult to penetrate — off the trail — as a tropical jungle. One of the worst obstacles to progress is the devil's club (*Fatsia horrida*), — a plant of the Ginseng family, — five or six feet tall, with countless sharp spines. Another barrier to progress is furnished by the alders, whose low branches are prostrate and spread in every direction. The bushes grow as compactly as a cultivated hedge and are as impassable. The flowers still in bloom at Glacier were few, several saxifrages, *Tiarella unifoliata*, painted cup, fireweed, crimson and yellow monkey flowers, etc. On the snow-sheds were many plants common to the East. Plants new to us were the goat's-beard spiræa, salmonberry, and a little claytonia. We saw in fruit, *Actæa spicata*, *Streptopus amplexifolius* and *S. brevipes*, and *Smilacina racemosa*. We found a most delicious blueberry and an abundance of raspberries.

Much interest was added to the lecture by stereopticon views of mountain scenery and flowers, the latter colored by Mrs. Van Brunt.

EXPERIMENT STATION REPORTS WANTED.

The Massachusetts Horticultural Society is endeavoring to collect complete sets of the Bulletins and other publications of all the Agricultural Experiment Stations in the United States and Canada. Those named below are wanting, and any person having a spare copy will confer a favor by addressing the Librarian of the Society, Horticultural Hall, No. 101 Tremont Street, Boston.

Alabama (Ag. and Mech. College Station). — Bulletins 4–6 (1884), 7–10 and 1–4 (1885), and 5–9 (1886). 7th Annual Report, for 1894.

Alabama (Canebrake Station). — All bulletins later than 18, and all Annual Reports later than the 3d, for 1890.

Arizona. — 4th Annual Report, for 1893.

Arkansas. — Bulletin 1. All Annual Reports later than the 4th, for 1891, except the 8th, for 1895.

California. — Bulletins 32, 1878, and 1, 2, 3, 5, and 50, New Series.

Colorado. — Bulletin 3.

Connecticut (New Haven Station). — Bulletins 1 to 67, inclusive. Annual Reports for 1877 to 1883, inclusive, except that for 1878.

Indiana (Purdue Univ. School of Ag.). — Bulletin 1. College Reports 1 to 14, inclusive.

Kentucky. — Bulletin 10.

Michigan. — 6th Annual Report, for 1892–93. (Contained in Report of Michigan Board of Agriculture, 1893.)

Missouri. — Bulletins 9, 13, 15, 16, 19, 20, 25, 26, and 33 of Old Series. All Annual Reports since the 1st, for 1888, except that for 1897.

New Jersey. — Bulletins 1, 4, 5, 15, 27, and 28.

New York (Cornell). — Annual Report, 1882–83 (Report of Agricultural Department of Cornell University).

North Carolina. — Bulletins 1 to 56, inclusive, and 69, 2d ed. 1st to 7th Biennial Reports. Meteorological Division, Bulletin 2 (68*b*), and 2d and 3d Annual Reports, for 1888 and 1889. Special Bulletins 1 (77*a*) and 4 (82*a*). Weekly Weather Crop Bulletins 1–21, 1888; 1–24, 1889; 1–25, 1890; 2 and 4, 1891.

North Dakota. — 4th Annual Report, for 1893.

Ohio. — All Bulletins of First Series, except 16, 17, 18, and 19.

Pennsylvania. — Annual Reports for 1869, 1872, 1879–80, 1881, 1882, 1883, and 1884. [All issued by the State College.] Bulletin of Information No. 1.

South Carolina. — All Bulletins of the Old Series (previous to 1888) on the work of the Experimental Farm of the South Carolina College. 3d Annual Report, for 1890, and 6th, for 1893.

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1898.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1899.

☞ SEE LAST PAGE OF COVER.

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, May 7, 1898.

An adjourned meeting of the Society was holden at eleven o'clock, the President in the chair.

A memorial of Fearing Burr, prepared by the Committee appointed for that purpose at the last meeting, was presented by the Secretary and was unanimously adopted, and it was ordered that it be entered on the records, and that a copy be sent to the family of the deceased. This memorial is as follows:

MEMORIAL OF FEARING BURR.

By the sudden death of Mr. Fearing Burr, on the fourth of October last, the Massachusetts Horticultural Society has lost one of its oldest as well as one of its former useful and interested members. His age at his decease was eighty-one years nine months and twenty-three days. He was elected a Life Member of the Society in 1852, having been proposed for membership by its late Vice-President, George W. Pratt, Esq.

Mr. Burr's horticultural experience began in early life, when he was employed upon the family estate, which covers many acres in the rear of the paternal homestead. The experience thus gained, added to his inherited tastes and subsequent business pursuits as copartner for twelve or more years with his cousin, Matthew H. Burr, under the firm name of M. & F. Burr, Seedsmen, of Boston, undoubtedly gave him creditable notice as a prominent horticulturist throughout the New England States, as well as in more distant localities. His correspondence and dealings with horticulturists and seedsmen from over-sea were not infrequent.

In 1865 he published "The Field and Garden Vegetables of America," a work of 674 pages, octavo. He also was a frequent

contributor upon various horticultural subjects connected with the farm and garden.

Mr. Burr had served this Society upon several of its important Committees, including those on Fruits, Vegetables, etc. He was one of a Committee to visit the Durfee gardens at Fall River, and was the recipient of several of the Society's valuable medals at various times. In 1857 the firm of M. & F. Burr was awarded a silver medal for its display of "Sixty Varieties of Beans, all neatly and correctly labelled." Medals were also awarded him on Burr's sweet corn, hybrids from which are now known under another name.

Mr. Burr was a diligent reader, a good converser and debater; and whatever topics were brought up, either in private or public discussion in which he took part, his remarks were received with attention for their real merit and practical bearing. He was never married. A brother and sister are all that remain of the family, and they will find in the treasures of memory the richest memorials of the many virtues which were the ornaments of his character.

Respectfully submitted by

GEORGE LINCOLN,
EDMUND HERSEY,
STARKES WHITON,
} *Committee.*

William C. Strong announced the decease of Ex-President James F. C. Hyde, and read the following memorial, which he had prepared:

MEMORIAL OF J. F. C. HYDE.

In the decease of Hon. J. F. C. Hyde, on the second instant, the Massachusetts Horticultural Society is called upon to mourn the loss of one of its earliest, most active, and constant members. For fifty years he has taken an interest and a prominent part in its exhibitions and in the administration of its government. With a natural fondness for the cultivation of the soil, he first engaged in the nursery business, and developed in an unusual degree a love for fruits and flowers, with a keen and critical appreciation of their quality, so that he was soon recognized as an authority in their nomenclature. For this reason he became at once a valued member of this Society, and for several years he served as Chairman of the Fruit Committee. In the year 1859

he was chosen a Vice-President, and served until the year 1866, when he was elected President, serving in this office for four years. He had marked success in the cultivation and exhibition of strawberries and other fruits, and also in seedling gladioli, carnations, sweet peas, and various other flowers, in the improvement of which he was an enthusiast. His example in finding delight and relief from the pressing activities of business and political life in the selection of best varieties, and in raising the standard of cultivation in the garden and orchard, was conspicuous and worthy of all imitation. It is with grateful emotions that we recall the good and useful work which he has done, the influence of which will live though he has passed on.

Of the many other important public services which Mr. Hyde has rendered in other fields of usefulness it is not our province to speak. But in his connection with this Society, which contributes so largely and so directly to the welfare of the community, we desire to express hearty testimony to his very great ability, enthusiastic devotion, and valuable service. It is, therefore,

Voted, That this testimonial be entered upon the records of the Society, and that a copy thereof be sent to the family of our deceased friend, with the assurance of our deep sympathy with them in their and our loss. The remembrance of his active and faithful life of service will be a precious and abiding legacy to them, and we trust will give a bright assurance of a higher immortal life.

The above memorial was unanimously adopted.

The President announced that Charles S. Sargent would be unable to serve as Chairman of the Committee to prepare a memorial of the late Hon. John Simpkins, and that he had appointed Hon. Charles F. Sprague to fill the vacancy.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

Frederick H. Kennard, of Brookline.
William Endicott, 3d, of Boston.
Mrs. George P. Sanger, of Boston.
Frank Brunton, of Boston.

Adjourned to Saturday, June 4.

BUSINESS MEETING.

SATURDAY, June 4, 1898.

An adjourned meeting of the Society was holden at eleven o'clock today, the President in the chair.

No business being brought before the meeting it was Dissolved.

BUSINESS MEETING.

SATURDAY, July 2, 1898.

A duly notified Stated Meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following amendment to the Constitution and By-Laws, introduced at the Stated Meeting on the second of April, and then ordered by a majority vote to be entered on the record, came up for final action, and having received a two-thirds vote, was declared adopted:

SECTION XVII., A.

COMMITTEE ON FORESTRY AND ROADSIDE IMPROVEMENT.

A Committee on Forestry and Roadside Improvement of five members shall give special attention to the subject of the preservation and improvement of the woodlands of Massachusetts; shall lend its assistance, so far as possible, to securing the planting of trees, and the preservation of those already planted, upon the borders of the highways of the Commonwealth; shall secure, so far as shall seem to it expedient, the enforcement of the laws of the Commonwealth relative to forests and trees; shall, with the approval of the Society, petition the Legislature for such changes in and additions to the laws as shall make them more efficient; shall submit to the Committee on Lectures and Publication plans for lectures, essays, and discussions on Forestry subjects; and shall have authority, with the approval of the Executive Committee, to offer prizes for written contributions to forestry knowledge, not exceeding the amount which the Society may place at its disposal.

The following named persons were then, agreeably to the above section of the Constitution and By-Laws, elected a Standing Committee on Forestry and Roadside Improvement:

HARVEY N. SHEPARD, *Chairman.*
NATHANIEL S. SHALER, JOHN G. JACK,
J. D. W. FRENCH, JAMES H. BOWDITCH.

The President, as Chairman of the Executive Committee, reported from that Committee a recommendation, adopted at the meeting of the Committee on the 30th of April, that the Society appropriate $150 for the use of the Committee on Forestry, etc. The appropriation was unanimously voted.

WILLIAM THATCHER, of Brookline, and
JOHN A. PETTIGREW, of Jamaica Plain,

having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected.

The following named persons, recommended by the Executive Committee, were elected Corresponding Members of the Society:

PETER BARR, of London, England.
JOHN GILBERT BAKER, F.R.S., F.L.S., Keeper of the Herbarium of the Royal Gardens, Kew, England.
F. W. BURBIDGE, M.A., Curator of Trinity College Botanic Gardens, Dublin, Ireland.
F. W. MOORE, Director of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.
ARCHIBALD F. BARRON, Turnham Green, London, W., England.

Adjourned to Saturday, August 6.

BUSINESS MEETING.

SATURDAY, August 6, 1898.

An adjourned meeting of the Society was holden today at eleven o'clock, Vice-President SAMUEL HARTWELL in the chair.

The Chair announced the following named Committee, appointed by the President, agreeably to the Constitution and

By-Laws, to nominate candidates for Officers and Standing Committees of the Society for the year 1899:

William H. Spooner, *Chairman.*

Benjamin M. Watson,	Patrick Norton,
Samuel Hartwell,	Azell C. Bowditch,
Benjamin P. Ware,	Charles F. Curtis.

It was voted that the Nominating Committee be empowered to fill any vacancies that might occur in their number.

The Secretary laid before the meeting a letter from John Gilbert Baker, Keeper of the Herbarium and Library of the Royal Botanic Gardens, Kew, England, expressing his sense of the high honor conferred on him by electing him a Corresponding Member of the Society.

Adjourned to Saturday, September 3.

BUSINESS MEETING.

SATURDAY, September 3, 1898.

An adjourned meeting of the Society was holden at eleven o'clock today, President APPLETON in the chair.

William H. Spooner, Chairman of the Committee appointed at the last meeting to nominate candidates for Officers and Standing Committees for the year 1899, reported a printed list, which was accepted. It was voted that the Committee be continued and requested to nominate candidates to fill any vacancies that might occur before the election.

The Secretary presented a memorial of Hon. John Simpkins, prepared by Hon. Charles F. Sprague, Chairman of a Committee appointed for that purpose. The memorial, which was unanimously adopted, is as follows:

MEMORIAL OF HON. JOHN SIMPKINS.

The Honorable John Simpkins was born in New Bedford, June 27, 1862. He spent his early years in Yarmouth, and laid the foundation of a healthy physique, which later made him distinguished as an athlete. He attended St. Mark's School, and went to Harvard, where he spent four years, graduating in the class of 1885. During his collegiate career he was one of the most popular men, and his sunny and cheery disposition brought

him many life-long friendships. He was also a first-class foot-ball player, and was ever in the thickest of the contest, and one of the most valuable men on the team.

He was always devoted to the Cape District, and spent all his leisure hours there, and, taking a great interest in horticultural matters, he exhibited many and various plants, chiefly chrysanthemums, and those of an aquatic nature, and took many prizes in the exhibitions of the Massachusetts Horticultural Society.

He took a great interest in public matters, and in 1891 and 1892 was elected to the State Senate as a Republican, and, although opposed to the Hon. William E. Russell on political grounds, enjoyed the firmest personal friendship with him during his term of service. In 1892 Mr. Simpkins was chosen a Presidential Elector, and in the same year was elected President of the Republican Club of Massachusetts, succeeding the Hon. Roger Wolcott. His course, while acting in this latter capacity, made him very popular with the members of the Club, and brought out his powers of organization, for which he was particularly distinguished.

In 1894 there was a call from the Cape end of the Thirteenth District that it should have a Representative in Congress, as no Representative had been granted them for over thirty years, and Mr. Simpkins was picked out for their candidate. He was nominated and elected by a large majority, and so valuable were his services that he was reëlected in 1896. His familiarity with the harbors and lighthouses on the long stretch of coast surrounding his district enabled him to appear before Committees in Congress, and to present their necessities in an interesting way. He was very successful in having his projects adopted, and when he was to speak on such matters his colleagues listened, for he was talking about what he knew.

Just before his untimely death he was selected by the unanimous vote of his colleagues from Massachusetts to represent them on the National Republican Committee, and this was their tribute to his good judgment.

In Congress he was much respected for his sterling character, his honesty, his genial nature, and his power of persuasion. His intimate friends will never forget his loss.

For the Committee,

CHARLES F. SPRAGUE.

The decease of George W. Campbell, of Delaware, Ohio, a Corresponding Member of the Society, of E. Lewis Sturtevant, M.D., and of David Nevins, was announced, and it was voted that the President appoint Committees to prepare memorials of these members. The President accordingly appointed as a Committee to prepare a memorial of Mr. Campbell, Benjamin G. Smith, Charles F. Curtis, and Robert Manning; to prepare a memorial of Dr. Sturtevant, William C. Strong, J. D. W. French, and Benjamin P. Ware; and to prepare a memorial of Mr. Nevins, N. I. Bowditch, Joseph H. Woodford, and J. Woodward Manning.

The Secretary laid before the Society letters from F. W. Moore, Director of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland, and F. W. Burbidge, Curator of the Botanical Gardens of Trinity College, Dublin, Ireland, acknowledging their election as Corresponding Members of the Society, and returning hearty thanks therefor.

Acknowledgments of the courtesy of the Society in giving the use of its Halls to the Society for the Promotion of Agricultural Science, the Linnæan Fern Chapter, and the American Forestry Association, with thanks therefor, were received from those organizations.

The following vote, moved by Joseph H. Woodford, was unanimously passed:

Voted, That the Treasurer cause to be engraved the names of the persons represented on all the busts in our Hall not now named.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, October 1, 1898.

A Stated Meeting of the Massachusetts Horticultural Society, being the Annual Meeting for the choice of Officers and Standing Committees, was holden today at eleven o'clock, Vice-President C. H. B. BRECK in the chair.

The Secretary stated that the meeting had been duly notified to the members of the Society agreeably to the Constitution and By-Laws.

William H. Spooner, Chairman of the Nominating Committee, reported that that Committee had nominated J. Woodward Manning as a member of the Committee on Forestry and Roadside Improvement, in place of James H. Bowditch, who was unable to serve. The report was accepted.

The Chair, agreeably to the Constitution and By-Laws, appointed Hon. Aaron Low, C. C. Shaw, and Francis Campbell a Committee to receive, assort, and count the votes given and report the number. The polls were opened at quarter past eleven o'clock.

William C. Strong, Chairman of the Committee appointed at the last meeting to prepare a memorial of Dr. E. Lewis Sturtevant, reported the following, which was unanimously adopted:

Memorial of Edward Lewis Sturtevant.

Edward Lewis Sturtevant, M.D., was born in Boston in 1842, was graduated from Bowdoin College in 1863, and from the Harvard Medical School in due course. He settled in South Framingham, and soon devoted himself to scientific agriculture on a large scale. He also became interested, with his brother, Joseph N. Sturtevant, in the breeding of dairy cattle, and was an earnest advocate of the Ayrshire stock, publishing a monograph entitled "The Dairy Cow." He became a life member of this Society in 1871, and for several years was an active member of the Committee on Publication and Discussion. In 1875 he established a new monthly magazine in Boston, entitled the "Scientific Farmer," which he continued for several years. In the year 1881 he was elected the first Director of the New York Experiment Station, which office he held for six years. In 1887 he was elected President of the national Society for the Promotion of Agricultural Science. In these many and varied fields of labor Dr. Sturtevant showed an active mind, quick to perceive possibilities, and alert to enter upon experiments with minute investigation. That he was successful in the various lines of work which he pursued is attested by the positions of honor to which he was called.

In his death, which occurred on the thirtieth of July last, at South Framingham, the Society mourns the loss of one of its most active, intelligent, and enthusiastic supporters — one who had in former years contributed largely to the interests of its library, its discussions, and its exhibitions. His many services will be held in grateful remembrance. The sympathy of the Society is hereby extended to the family and relatives of the deceased.

WM. C. STRONG,
BENJ'N P. WARE, } *Committee.*

Benjamin G. Smith, Chairman of a Committee appointed at the last meeting to prepare a memorial of George W. Campbell, reported the following, which was unanimously adopted:

MEMORIAL OF GEORGE W. CAMPBELL.

George Washington Campbell, of Delaware, Ohio, was born in Cherry Valley, N.Y., January 12, 1817, and died July 15, 1898. He was one of the foremost and best known horticulturists of this country, and an amiable, refined, and accomplished gentleman of high scientific attainments. For more than forty years Mr. Campbell had been a devoted student of the science of horticulture, and in practice he had been eminently successful in originating and again in improving, some of the finest and most popular varieties of fruits, especially grapes. Among the best known and most valuable which he introduced and disseminated is the Delaware grape. The Campbell's Early, which was originated by him after years of careful, intelligent painstaking, developed into beautiful perfection, and is now rich in its promise of reward for all his tender care of this last gift to the science he so loved and honored. His extensive glass houses in other years witnessed, too, to the cultured world; here floriculture shared in this intelligent care and love of fruits, in both of which he was looked upon as a standard authority.

Mr. Campbell was elected a Corresponding Member of this Society in 1875. For many years he was President of the Ohio State Horticultural Society. He was also a member of the American Association of Nurserymen, and was appointed by President Hayes United States Commissioner to the Paris World's Fair in 1879. He was a member of the American Pomological Society

from its beginning, and at its last session, at Columbus, Ohio, was elected its First Vice-President. At this session, which occurred only a year ago, he appeared to be full of energy and life, and took as much interest in the proceedings as any of the youngest members. He was ready to give his unbiased opinion to those who sought it, and his death will be a severe loss, not only to his family and many friends, but to American horticultural interests generally.

Mr. Campbell was married August 27, 1846, to Miss Elizabeth Little, the golden wedding of which happy union was quietly celebrated in 1896, and the wife of these fifty years of only golden memories, and three children, miss and mourn a more than usually loving and devoted husband and father. Mr. Campbell was a good citizen, a warm friend, a devoted churchman, and a Christian gentleman. To the members of his family this Society tenders its sincere sympathy in their affliction.

BENJ. G. SMITH,
CHARLES F. CURTIS, } *Committee.*
ROBERT MANNING,

A report was presented from the Executive Committee, unanimously recommending that an additional appropriation of $39 be made for prizes for flowers in 1897, agreeably to the request of the Committee on Flowers. The appropriation was unanimously voted.

The following vote, moved by Henry L. Clapp, was unanimously passed in the affirmative:

Voted, That all exhibitions of native plants, heretofore in charge of the Flower Committee, be transferred to the Special Committee on School Gardens and Children's Herbariums, said Committee to have full power to award prizes and gratuities in such manner as they may consider best for the interests of the Society.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

CHARLES J. SANTHESON, of Reading.
THOMAS ALLEN, of Boston.
EDWIN C. LEWIS, of Taunton.
DAVID FRANK ROY, of Malden.

The polls were closed at a quarter past one.

The Committee to receive, assort, and count the votes, and report the number given, reported the whole number of ballots cast to be fifty, and that the persons named on the ticket presented by the Nominating Committee had a plurality and were elected.

The report was accepted, and the persons named on the above-mentioned ticket were, agreeably to the Constitution and By-Laws, declared by the Chairman to have a plurality of votes, and to be elected Officers and Standing Committees of the Society for the year 1899.

Adjourned to Saturday, November 5.

BUSINESS MEETING.

SATURDAY, November 5, 1898.

An adjourned meeting of the Society was holden today at eleven o'clock, the President in the chair.

The President, as Chairman of the Executive Committee, reported from that Committee a recommendation that the Society make the same appropriations for Prizes and Gratuities for the year 1899 as the present year, viz.:

For Prizes and Gratuities:

For Plants	$2,000
" Flowers	2,668
" Fruits	1,732
" Vegetables	1,200
" Gardens	500
Total for Prizes and Gratuities for the year 1899 .	$8,100

The report was accepted, and, agreeably to the Constitution and By-Laws, was laid over for final action until the first Saturday in January next.

The following votes were unanimously passed:

Voted, That this Society extend to the National Farmers' Congress the free use of its Halls and Library, for their meeting of

1899, if they shall honor this State and City by deciding to meet here.

Voted, That the President of this Society be authorized to attend the National Farmers' Congress, at Fort Worth, Texas, December 4–16, 1898, and act as a delegate from this Society.

The Secretary laid before the Society a letter acknowledging, in behalf of the family of the late Dr. E. Lewis Sturtevant, the memorial of him adopted by the Society, and expressing the value in which they held the appreciation of his work by the Society.

The decease of Isidor Bush, of Bushberg, Missouri, a Corresponding Member of the Society, was announced, and it was voted that the President appoint a Committee of three to prepare a memorial of Mr. Bush. The President appointed as that Committee William C. Strong, J. W. Manning, and Samuel Hartwell.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

Miss Mabel Congdon, of Cambridge.
Miss Helen F. Ayers, of Medford.
Henry A. Root, of Winthrop Highlands.

Adjourned to Saturday, December 3.

BUSINESS MEETING.

Saturday, December 3, 1898.

An adjourned meeting of the Society was holden today at eleven o'clock, the President in the chair.

The Annual Report of the Committee on Flowers was presented by J. Woodward Manning, Chairman, accepted, and referred to the Committee on Publication.

The Annual Report of the Committee on the Library was read by W. E. Endicott, Chairman, accepted, and referred to the Committee on Publication.

J. Woodward Manning, for the Committee on Establishing Prizes, presented the List of Prizes recommended by that Com-

mittee to be offered for the year 1899, and stated the principal changes from that of the present year. The report was accepted and referred to the Committee on Publication, to be printed as the Schedule of Prizes for 1899.

A document establishing the Henry A. Gane Memorial Fund was read and referred to the Finance Committee.

It was voted to extend to the State Board of Agriculture the free use of the Society's Halls and Library for their Annual Meeting in December, 1899, if they shall honor the City by deciding to meet here.

The following named persons were appointed members of the Committee on School Gardens and Children's Herbariums for the year 1899:

Henry L. Clapp, *Chairman.*

George E. Davenport,	Mrs. M. L. Stevens,
Miss Katharine W. Huston,	Charles W. Jenks,
Mrs. P. D. Richards,	William E. C. Rich, *Secretary.*

A letter was read from William A. Taylor, Secretary of the American Pomological Society, asking for the appointment of a delegation to the meeting of that Society (probably at Philadelphia) in September, 1899. It was voted that the Fruit Committee, with such as they may join, constitute that delegation.

The following named persons, having been recommended by the Executive Committee, were on ballot duly elected to member ship in the Society:

Howard Marston, of Boston.
Robert Laurie, of Newport, R.I.
John C. Daly, of Roxbury.
Ernst G. Asmus, of West Hoboken, N.J.

Adjourned to Saturday, December 17.

BUSINESS MEETING.

Saturday, December 17, 1898.

An adjourned meeting of the Society was holden today at eleven o'clock. Neither the President nor either of the Vice-Presidents being present, the meeting was called to order by the

Secretary, and Ex-President William H. Spooner was unanimously elected Chairman *pro tem.*

The Report of the Committee on Plants, the Report of the Committee on Vegetables, the Report of the Committee of Arrangements, and the Report of the Secretary and Librarian were presented. It was

Voted, That these reports be accepted without reading, and referred to the Committee on Publication, provided that that Committee will have them printed within two months.

The Secretary laid before the Society a letter from the Secretary of the State Board of Agriculture, acknowledging the courtesy of the Society in offering the use of its Halls for the public winter meeting of the Board in 1899, and thanking the Society therefor.

Adjourned to Saturday, December 24.

BUSINESS MEETING.

SATURDAY, December 24, 1898.

An adjourned meeting of the Society was holden at eleven o'clock today, the President in the chair.

William C. Strong, Chairman of the Committee appointed at the meeting of the Society on the fifth of November to prepare a memorial of the late Isidor Bush, reported as follows:

MEMORIAL OF ISIDOR BUSH.

The Committee to whom was referred action in regard to the death of Isidor Bush present the following testimonial:

Isidor Bush died on the fifth of August, 1898, in the city of St. Louis, Missouri, of which city he had been a resident for the past forty-nine years. He was born at Prague, Bohemia, in 1822. As a result of participation in the revolution of 1848, he came to America in that year. During our Civil War he was Secretary to General Fremont. In the year 1865 he was a member of the State Convention of Missouri.

Soon after this he established a grape nursery at a locality in Missouri which he named Bushberg, and devoted himself to the

cultivation of this specialty with marked enthusiasm. He soon had a large collection of all the known species and varieties of our native grapes, and with the assistance of the eminent botanist Dr. George Engelmann a very complete classification of the various species was made and their characteristics were very fully described. To this Mr. Bush added a full description of over five hundred varieties of grapes, with careful directions as to propagation and culture. This work was embodied and published in what Mr. Bush modestly called a Catalogue, but since its first appearance it has proved to be of such practical usefulness, as well as of permanent value for its botanical research, that it has reappeared in several editions, has been translated into foreign languages, and is recognized as an authoritative Grape Manual.

It was through the enterprise of Mr. Bush that our immune grape roots were sent to Europe, for the purpose of grafting the vinifera varieties upon them, and thus preventing the ravages of the phylloxera. We knew Mr. Bush personally through his active membership in the American Pomological Society — a wide-awake, alert little man, always so cheery and responsive as to earn from President Wilder the endearing title "My Isidor." The Massachusetts Horticultural Society in 1878 elected Mr. Bush a Corresponding Member, and has received from him copies of his valuable treatises. And now that he has passed on, it places on its record its appreciation of his character, and the permanent value of his services.

It is further

Voted, That the Secretary be requested to send a copy of this action to the family of the deceased.

WILLIAM C. STRONG,
SAMUEL HARTWELL,
JACOB W. MANNING,
Committee.

After remarks by Mr. Manning, of the Committee, the testimonial was unanimously adopted.

The President, from the Finance Committee, to which was referred, at the meeting on the third of December, 1898, a document establishing the Henry A. Gane Memorial Fund, reported, recommending that the Society accept the donation.

Voted, That the Society accept the gift of one thousand dollars

from Mrs. Jerome Jones to constitute the Henry A. Gane Memorial Fund; that the Secretary write to Mrs. Jones expressing the thanks of the Society for the gift, and that the Treasurer be, and he hereby is, authorized to sign the receipt for $1,000.

The instrument of donation is as follows:

This instrument witnesseth: That Mrs. Jerome Jones doth hereby give unto the Massachusetts Horticultural Society the sum of One Thousand Dollars to hold in trust for the use or purposes following, and upon conditions set forth, namely:

To pay out of the income of said money, or funds of the said Society, the sum of fifty dollars, to be expended and applied in premiums, as follows:

PRIZES OFFERED FROM THE HENRY A. GANE MEMORIAL FUND.

For the best twelve specimen blooms of any of the seedling chrysanthemums originated by the late Henry A. Gane	$20 00
Second prize	10 00
For the best three specimen plants of any seedling chrysanthemums, not less than three varieties, originated by the late Henry A. Gane	12 00
Second prize	8 00

For the term of three years.

After said three years, Premiums as follows:

PRIZES OFFERED FROM THE HENRY A. GANE MEMORIAL FUND.

For the best twelve specimen blooms of any of the seedling chrysanthemums originated by the late Henry A. Gane	$20 00
For the best three specimen plants of any seedling chrysanthemums, not less than three varieties, originated by the late Henry A. Gane	15 00
For the best new seedling chrysanthemum originated by any other grower	15 00

At the end of ten years a change in the terms of these prizes may be made if agreed to by the donor and the Society.

Prizes not awarded at any time to be cumulative in the Fund.

The Massachusetts Horticultural Society hereby acknowledges the receipt of the above mentioned sum of One Thousand Dollars, the income to be expended as above provided.

(Signed) CHARLES E. RICHARDSON,
Treasurer Massachusetts Horticultural Society.

It was voted that all reports of committees not presented be referred to the Committee on Publication.

The meeting was then dissolved.

REPORT

OF THE

COMMITTEE ON PLANTS,

FOR THE YEAR 1898.

By AZELL C. BOWDITCH, CHAIRMAN.

Your Committee would say that the number of exhibitors was not as large the past year as in previous seasons. This is attributed to our being obliged to cut down some of the larger prizes, in order to make room for prizes for new things that are constantly brought to our notice, and at the same time to keep within the appropriation. For instance, the first prize for Groups of Plants, which form quite a feature, at the annual exhibition, is only twenty-five dollars. This will hardly pay a man for the carting, as it takes about fifty plants to make an acceptable group. This season there was but one exhibitor. We mention this as one of the ways in which your Committee are handicapped in their endeavors to interest the public and make the exhibitions creditable to the Society. The weather has been another factor with which we have had to contend. Cold and wet had made it almost impossible for us to give good exhibitions, and the postponing of shows is very disappointing.

January 1. — *Cypripedium bellatulum album* was exhibited for the first time in America, by William Wallace Lunt.

January 8. — Joseph H. White (James Wheeler, gardener) exhibited *Begonia incarnata superba*, which your Committee thought well of and for which they awarded a First Class Certificate of Merit.

January 22. — Cypripedium President McKinley, a new American seedling, parents *C. insigne Chantinii* and *C. Harrisianum su-*

perbum, raised by Hon. C. G. Roebling, of Trenton, N.J., was exhibited. Your Committee awarded it a First Class Certificate of Merit.

January 29. — Mrs. B. P. Cheney was awarded a Silver Medal for *Primula obconica grandiflora*, which your Committee thought well of as a window plant, as it will continue in bloom all the winter months.

March 5. — R. & J. Farquhar & Co. exhibited Narcissus Victoria, a large flower; color, light lemon to deep orange. It was quite an improvement over others of its class, and your Committee deemed it worthy of a First Class Certificate of Merit.

March 19. — W. W. Lunt exhibited Lælio-Cattleya Mrs. John D. Long, a hybrid between *Lælio-Cattleya elegans* var. *Warneri* and *Cattleya superba* var. *splendens*. While partaking of the characteristics of both parents, it was certainly a marked improvement, and is believed to be the first hybrid Lælio-Cattleya of American parentage. It was awarded a Silver Medal.

SPRING EXHIBITION.

March 22, 23, 24, and 25.

This exhibition was most certainly a success. The halls were well filled and most of the prizes were contended for. Among the most prominent exhibitors were John L. Gardner, Dr. C. G. Weld, and W. S. Ewell & Son, and their plants showed marked skill in cultivation and an improvement over plants of former years.

April 30. — Oakes Ames exhibited a very fine plant of Cypripedium Gertrude Hollington, a cross between *C. bellatulum* and *C. ciliolare*, the largest ever shown, having three flowers and three buds. It was awarded the Silver Gilt Medal.

June 11. — W. W. Lunt had a very fine plant of *Cattleya Morganæ superbum*, bearing a spike of very pure white flowers. It was awarded a Silver Gilt Medal.

ROSE AND STRAWBERRY EXHIBITION.

June 23 and 24.

W. P. Winsor, of Fairhaven, made a very fine display of Orchids, as did also John L. Gardner. Both were awarded prizes.

July 23. — Robert Laurie, of Newport, R.I., exhibited some pans of a very dwarf variety of Tropæolum, named Vesuvius. Your Committee think that from its very bright color and compact dwarf habit this may be a very useful bedding plant. They awarded it a First Class Certificate of Merit.

August 27. — Oakes Ames placed on the table *Cypripedium insigne* Laura Kimball, a beautiful yellow variety, quite distinct and well worthy a Silver Medal, which was awarded it.

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

September 29 and 30.

George McWilliam exhibited a fine lot of seedling Dipladenias, the most noteworthy of which was a beautiful pink variety named Elsa Whitin, for which was awarded a Silver Medal.

Oakes Ames was also awarded a Silver Medal for the introduction of *Dracæna Godseffiana*. Your Committee consider this novelty well worth growing.

CHRYSANTHEMUM EXHIBITION.

November 8, 9, 10, and 11.

This show had not nearly as many exhibitors as in former years, but what it lacked in quantity it made up in quality. J. S. Bailey had some very fine specimens, as did also Mrs. B. P. Cheney, who was a close second, with a fine lot of very compact and well-flowered plants. William Edgar made a fine display of Begonia Gloire de Lorraine, which your Committee think well of, its dwarf habit and constant flowering making it a most desirable house plant.

November 19. — George McWilliam made a fine display of seedling Dipladenias, one of which, Elizabeth K. Whitin, a beautiful pale pink with a rosy carmine throat, well marked, your Committee thought worthy of a Silver Medal.

Prospective Prize.

The Committee have awarded to James Wheeler the Society's Prospective Prize for the best Seedling Flowering Plant, a seedling white Azalea, $30.

This Azalea has been exhibited for three years. The flower is very large, pure white, of fine shape, and has very firm petals.

Amount appropriated		$2,000 00
Awarded in Premiums and Gratuities .	$1,516 00	
Fifteen Silver Medals	105 00	
Three Silver Gilt Medals	45 00	
Total		1,666 00
Balance unexpended		$334 00

All of which is respectfully submitted,

A. C. BOWDITCH,
Chairman.

PRIZES AND GRATUITIES AWARDED FOR PLANTS.

1898.

January 1.

Gratuity : —

Henry A. Wheeler, Rose plant $1 00

January 8.

Chinese Primroses. — Six plants, in six-inch pots :

First, Mrs. B. P. Cheney 5 00
Second, Joseph H. White 4 00
Third, Mrs. B. P. Cheney 3 00

Gratuities : —

E. S. Converse, Display of Primroses 3 00
John L. Gardner, *Primula stellata* 3 00
Mrs. B. P. Cheney, " " 2 00

January 15.

Gratuity : —

James E. Rothwell, Display of Orchids 4 00

January 22.

Gratuity : —

Hon. C. G. Roebling, Trenton, N.J., Display of Orchids . . . 3 00

February 12.

Gratuity : —

J. E. Rothwell, *Cypripedium Sallieri*, *C. concolor*, and *C. nitens superbum* 2 00

February 19.

Gratuity : —

John L. Gardner, Six plants of *Primula Sinensis* (double) . . 3 00

February 26.

Gratuity : —

James Comley, *Cypripedium villosum* 3 00

March 12.

Gratuities : —

J. E. Rothwell, Display of Orchids 3 00
Rea Brothers, Rose plant 1 00

March 19.

Gratuity : —

Edward Butler, *Dendrobium nobile* 5 00

SPRING EXHIBITION.

MARCH 22, 23, 24, AND 25.

Theodore Lyman Fund.

INDIAN AZALEAS. — Four named varieties:

First, Dr. C. G. Weld	12 00
Second, J. W. Howard	10 00

Two named varieties:

First, Edward Butler	6 00

Specimen plant, named:

First, Edward Butler	10 00
Second, Dr. C. G. Weld	8 00
Third, Dr. C. G. Weld	5 00

Society's Prizes.

ORCHIDS. — Three plants:

Second, John L. Gardner	8 00

Single plant:

First, John L. Gardner	5 00

STOVE OR GREENHOUSE PLANT. — Specimen in bloom, other than Azalea or Orchid:

First, Dr. C. G. Weld	10 00
Second, Dr. C. G. Weld	8 00

CLIMBING ROSE. — Specimen plant in bloom:

First, C. H. Souther	8 00

HARDY FLOWERING DECIDUOUS SHRUBS, FORCED. — Four, of four distinct species, named:

First, Bussey Institution	6 00
Second, Bussey Institution	4 00

HARDY PRIMROSES. — Twelve plants, of distinct varieties:

First, John L. Gardner	8 00

HARDY POLYANTHUSES. — Twelve plants, of distinct varieties:

First, John L. Gardner	8 00
Second, John L. Gardner	6 00
Third, Dr. C. G. Weld	4 00

AURICULAS. — Six, in pots:

First, Dr. C. G. Weld	6 00
Second, Dr. C. G. Weld	4 00

CYCLAMENS. — Ten plants:

First, J. S. Bailey	15 00
Second, Mrs. B. P. Cheney	12 00

Ten plants, in seven-inch pots:

First, Mrs. B. P. Cheney	8 00
Second, Mrs. B. P. Cheney	6 00
Third, J. S. Bailey	4 00

Single plant:	
First, Mrs. B. P. Cheney	5 00
Second, James Garthley	4 00
Third, J. S. Bailey	3 00
CINERARIAS. — Six varieties:	
First, C. H. Souther	10 00
Second, John L. Gardner	8 00
Third, Dr. C. G. Weld	6 00
Fourth, E. S. Converse	4 00
Three varieties:	
First, James Garthley	6 00
Second, Dr. C. G. Weld	5 00
Third, E. S. Converse	4 00
Single plant:	
First, C. H. Souther	4 00
Second, John L. Gardner	3 00
Third, E. S. Converse	2 00
HYACINTHS. — Twelve named varieties, in pots:	
First, John L. Gardner	6 00
Second, Dr. C. G. Weld	4 00
Third, Bussey Institution	3 00
Six named varieties, in pots, one in each pot:	
First, Bussey Institution	5 00
Second, John L. Gardner	4 00
Third, E. S. Converse	3 00
Single named bulb, in pot:	
First, E. S. Converse	2 00
Second, John L. Gardner	1 00
Three pans, not to exceed twelve inches, ten bulbs of one variety in each pan:	
First, Dr. C. G. Weld	6 00
Second, John L. Gardner	4 00
Third, Bussey Institution	3 00
Two pans, not to exceed twelve inches, ten bulbs of one variety in each pan:	
First, John L. Gardner	4 00
Second, Dr. C. G. Weld	3 00
Third, E. S. Converse	2 00
Single pan, not to exceed twelve inches, with ten bulbs of one variety:	
First, Bussey Institution	3 00
Second, Bussey Institution	2 00
Third, E. S. Converse	1 00
TULIPS. — Six eight-inch pans, nine bulbs of one variety in each:	
First, Dr. C. G. Weld	4 00
Second, Bussey Institution	3 00
Third, W. S. Ewell & Son	2 00

Three eight-inch pans, nine bulbs of one variety in each:

First, E. S. Converse	3 00
Second, W. S. Ewell & Son	2 00
Third, Bussey Institution	1 00

Three ten-inch pans, twelve bulbs of one variety in each:

First, Dr. C. G. Weld	5 00
Second, Bussey Institution	4 00
Third, Dr. C. G. Weld	3 00

POLYANTHUS NARCISSUS. — Four seven-inch pots, four bulbs in each, distinct varieties:

First, John L. Gardner	4 00
Second, Bussey Institution	3 00

JONQUILS. — Six pots or pans, not exceeding eight inches, the number of bulbs in each to be at the discretion of the grower:

First, W. S. Ewell & Son	4 00
Second, Dr. C. G. Weld	3 00
Third, John L. Gardner	2 00

NARCISSUSES. — Six eight-inch pans, distinct varieties, single or double:

First, W. S. Ewell & Son	4 00
Second, Dr. C. G. Weld	3 00

Three eight-inch pans:

First, W. S. Ewell & Son	3 00
Second, Bussey Institution	2 00

LILIUM HARRISII. — Six pots, not exceeding ten inches:

First, J. W. Howard	10 00
Second, J. W. Howard	8 00

LILY OF THE VALLEY. — Six pots or pans, not exceeding ten inches:

First, Bussey Institution	4 00

CROCUSES. — Three ten-inch pans, distinct varieties:

First, W. S. Ewell & Son	3 00

ANEMONES. — Three pots or pans:

First, Bussey Institution	4 00
Second, Bussey Institution	3 00

FREESIAS. — Six pots or pans:

First, Dr. C. G. Weld	3 00

IXIAS. — Six pots or pans, in varieties:

First, Dr. C. G. Weld	4 00

TRITONIAS. — Six pots or pans, in varieties:

First, Dr. C. G. Weld	3 00

ROMAN HYACINTHS. — Six eight-inch pans, ten bulbs in a pan:

First, Dr. C. G. Weld	3 00
Second, W. S. Ewell & Son	2 00
Third, Bussey Institution	1 00

GENERAL DISPLAY OF SPRING BULBS. — All classes:

First, W. S. Ewell & Son	15 00
Second, Bussey Institution	12 00

Gratuities: —

Bayard Thayer (James Brydon, gardener), *Cattleya Schröderæ* . 4 00
Harvard Botanic Garden (Robert Cameron, gardener), *Dendrobium Fytchianum* 3 00
Joseph Tailby & Son, Climbing Rose 2 00
Bussey Institution, Grape Hyacinths 1 00
R. & J. Farquhar & Co., Lily of the Valley 2 00
William A. Bock, Display 8 00
Mrs. B. P. Cheney " 5 00
John L. Gardner " 5 00
James Garthley " 3 00
Dr. C. G. Weld " 2 00

APRIL 2.

Gratuity: —

Mrs. A. W. Blake, *Iberis perennis* and *Hydrangea Otaksa* . . 2 00

APRIL 9.

Gratuity: —

J. E. Rothwell, *Oncidium ampliatum* 3 00

APRIL 16.

Gratuities: —

Henry A. Wheeler, Crimson Rambler Rose 1 00
J. W. Howard, *Amaryllis vittata hybrida*, seedling 1 00

APRIL 23.

Gratuities: —

James Comley, *Cytisus albus* 2 00
Mrs. D. M. Folger, Gloxinia 1 00
C. E. Richardson, Seedling Amaryllis 1 00

APRIL 30.

Gratuity: —

Edward J. Mitton, *Chorizema Lowii* 3 00

MAY EXHIBITION.

MAY 7.

PELARGONIUMS. — Six named Show or Fancy varieties, in not less than eight-inch pots, in bloom:

First, N. T. Kidder 10 00

Six pots or pans of Ivy-Leaved, in bloom:

First, John Jeffries 6 00

INDIAN AZALEAS. — Six plants, in pots, named:

First, Dr. C. G. Weld	8 00
Single specimen:	
First, Dr. C. G. Weld	3 00
Second, Dr. C. G. Weld	2 00

CALCEOLARIAS. — Six varieties, in pots:

First, Mrs. B. P. Cheney	10 00
Second, Dr. C. G. Weld	8 00
Third, Mrs. B. P. Cheney	6 00
Fourth, J. S. Bailey	4 00
Single specimen:	
First, J. S. Bailey	3 00
Second, Mrs. B. P. Cheney	2 00
Third, E. S. Converse	1 00

ORCHIDS. — Display, named:

First, J. E. Rothwell	12 00

Gratuities: —

Edward J. Mitton, Display	2 00
Mrs. A. W. Blake, "	2 00

MAY 21.

Gratuities: —

Mrs. A. W. Blake, Display of *Azalea Indica*	3 00
J. E. Rothwell, *Oncidium Marshallianum*	1 00

RHODODENDRON SHOW.

JUNE 7 AND 8 (*postponed from* JUNE 2 AND 3).

ORCHIDS. — Display arranged for effect, with foliage plants:

First, John L. Gardner	30 00

Gratuities: —

Kenneth Finlayson, *Cypripedium Lawrenceanum*, four pots	6 00
J. S. Bailey, *Cattleya Gaskelliana*	3 00
Kenneth Finlayson, Pelargoniums, six pots	5 00
Mrs. A. W. Blake, Display of Azaleas	3 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 23 AND 24.

GLOXINIAS. — Six plants in not less than eight-inch pots:

First, James L. Little	8 00

ORCHIDS. — Six plants, of six named varieties, in bloom:

First, W. P. Winsor	15 00
Second, W. P. Winsor	10 00

Three plants, of three named varieties, in bloom:
First, W. P. Winsor 10 00
Second, John L. Gardner 8 00
Single specimen, named:
First, W. P. Winsor, *Cœlogyne Dayana* 5 00
Second, W. P. Winsor, *Cypripedium grande atratum* . . 3 00

Gratuities: —
E. J. Mitton, Display of Pelargoniums 8 00
Walter Hunnewell, Hydrangeas 1 00

JULY 23.

Gratuity: —
Mrs. A. W. Blake, *Cattleya gigas* 1 00

JULY 30.

Gratuity: —
J. E. Rothwell, New American Cypripedium, *Lawrenceanum* × *Marshallianum* 2 00

AUGUST 6.

Gratuity: —
J. E. Rothwell, Cypripedium A. de Lairesse 5 00

AUGUST 13.

Gratuity: —
H. A. Wheeler, *Torenia Fournieri* 2 00

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

AUGUST 20.

OUVIRANDRA FENESTRALIS. —
First, E. S. Converse 8 00
Second, John L. Gardner 6 00

Gratuities: —
E. A. & W. K. Wood, *Stanhopea tigrina* 2 00
John L. Gardner, *Cypripedium Morganiæ* 1 00
E. J. Mitton, *Dieffenbachia Bausei* and *Cyanophyllum magnificum* . 2 00
W. H. Lincoln, *Adiantum concinnum* 2 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 31 AND SEPTEMBER 1.

H. H. Hunnewell Fund.

HARDY CONIFEROUS TREES. — Display in pots and tubs, named:
First, Francis Blake 25 00

Society's Prizes.

PALMS. — Pair, in pots or tubs not more than twenty-four inches in diameter:
First, Dr. C. G. Weld 12 00

GREENHOUSE PLANTS. — Collection, containing foliage plants of all descriptions, not to exceed forty plants, in pots or tubs:
First, J. S. Bailey 40 00
Second, John L. Gardner 30 00

Six Greenhouse and Stove plants, of different named varieties, two Crotons admissible:
First, N. T. Kidder 25 00
Second, Dr. C. G. Weld 20 00
Third, John L. Gardner 15 00

TABLE DECORATION. — For fifteen covers, living plants, in one receptacle, only one entry admissible:
First, Mrs. E. M. Gill 10 00
Second, H. A. Wheeler 8 00
Third, E. S. Converse 6 00
Fourth, W. S. Lincoln 4 00

SPECIMEN FLOWERING GREENHOUSE PLANT. — Single named variety:
First, N. T. Kidder 8 00

CALADIUMS. — Six named varieties:
First, N. T. Kidder 8 00
Second, Dr. C. G. Weld 6 00

FERNS. — Six named varieties, no Adiantums admissible:
First, Dr. C. G. Weld 10 00

Specimen, other than Tree Fern:
First, H. H. Hunnewell 4 00
Second, N. T. Kidder 3 00

ADIANTUMS. — Five named varieties:
First, Dr. C. G. Weld 8 00

LYCOPODS. — Four named varieties:
First, Dr. C. G. Weld 5 00

DRACÆNAS. — Six named varieties:
First, Dr. C. G. Weld 8 00

CROTONS. — Six named varieties, in not less than eight-inch pots:
First, Dr. C. G. Weld 10 00

CYCAD. — Single plant, named:
First, H. H. Hunnewell 10 00
Second, James L. Little 8 00
Third, J. W. Howard 6 00

ORCHIDS. — Six plants, named varieties, in bloom:
First, J. E. Rothwell 15 00

Three plants, named varieties, in bloom:
Second, H. A. Wheeler 8 00

Single plant, in bloom:
First, J. E. Rothwell 5 00
Second, H. A. Wheeler 4 00

BEGONIA REX. — Six pots, of six varieties:

First, E. S. Converse	8 00
Second, E. J. Mitton	6 00

BEGONIAS, REX HYBRIDS. — Collection, named:

First, E. S. Converse	8 00
Second, E. J. Mitton	6 00

CANNAS. — Collection of not less than ten named varieties, grown in pots or tubs:

Second, C. H. Souther	8 00

Gratuities: —

Yamanaka & Co., Collection of Japanese plants	20 00
J. S. Bailey, *Adiantum Farleyense*	10 00
E. S. Converse, *Fittonia argyroneura*	2 00
J. W. Howard, Collection of Ferns	5 00
J. E. Rothwell, Thirty named Crotons	8 00
Charles H. Souther, Anthuriums	5 00
J. L. Little, Begonias	5 00
N. T. Kidder, Collection	10 00

SEPTEMBER 10.

Gratuity: —

Oakes Ames, *Cypripedium Gravesiæ*	1 00

SEPTEMBER 24.

Gratuity: —

James Comley, Rhododendron Maiden's Blush	2 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 29 AND 30.

Gratuity: —

E. S. Converse, Display of Plants	25 00

OCTOBER 8.

Gratuities: —

J. E. Rothwell, *Oncidium varicosum* and *Cattleya aurea* var. *Rothwelliana*	3 00
E. J. Mitton, Two plants *Cattleya labiata*	3 00

OCTOBER 22.

Gratuity: —

J. E. Rothwell, *Cattleya labiata*	2 00

OCTOBER 29.

Gratuities: —

J. E. Rothwell, *Cypripedium Arthurianum pulchellum*	2 00
J. E. Rothwell, *Vanda cærulea*	2 00

CHRYSANTHEMUM EXHIBITION.

NOVEMBER 8, 9, 10, AND 11.

CHRYSANTHEMUMS. — Display of twelve named plants, any or all classes, distinct varieties:

First, J. S. Bailey	50 00
Second, Mrs. B. P. Cheney	40 00
Fourth, E. S. Converse	20 00
Three Japanese Incurved:	
First, Mrs. B. P. Cheney	10 00
Second, J. S. Bailey	7 00
Third, Mrs. B. P. Cheney	5 00
Three Reflexed, distinct named varieties:	
First, Mrs. B. P. Cheney	10 00
Second, J. S. Bailey	7 00
Third, Mrs. B. P. Cheney	5 00
Specimen Incurved, named variety:	
First, James Garthley	6 00
Second, J. S. Bailey	5 00
Third, J. S. Bailey	4 00
Specimen Reflexed, named variety:	
First, Mrs. B. P. Cheney	6 00
Second, J. S. Bailey	5 00
Specimen Anemone Flowered, named variety:	
First, J. S. Bailey	6 00
Second, Mrs. B. P. Cheney	5 00
Third, Mrs. B. P. Cheney	4 00
Specimen Pompon, named variety:	
First, Mrs. B. P. Cheney	4 00
Second, Mrs. B. P. Cheney	3 00
Twelve plants, of twelve different varieties, grown to one stem and bloom, in not over six-inch pots, preference being given to plants not more than three feet in height:	
First, Mrs. A. W. Blake	10 00
Second, Mrs. A. W. Blake	8 00
Third, Dr. C. G. Weld	6 00
Fourth, C. H. Souther	4 00
Six plants grown as above, but all of one color, Red:	
First, J. L. Little	5 00
Second, Dr. C. G. Weld	4 00
Third, E. S. Converse	3 00
White:	
First, Dr. C. G. Weld	5 00
Second, C. H. Souther	4 00
Third, J. L. Little	3 00

Pink:
First, Dr. C. G. Weld 5 00
Second, Dr. C. G. Weld 4 00
Third, J. L. Little 3 00
Yellow:
First, Dr. C. G. Weld 5 00
Second, J. L. Little 4 00
Third, James Nicol 3 00
Any other color:
First, Mrs. A. W. Blake 5 00
Second, Dr. C. G. Weld 4 00
Third, Mrs. A. W. Blake 3 00
Group of Chrysanthemums, without stakes, arranged for effect, limited to one hundred square feet, and edged with ferns or low growing decorative plants:
First, Mrs. A. W. Blake 25 00

Gratuities: —
William Edgar, Begonia Gloire de Lorraine 20 00
James Garthley, Chrysanthemum Le Colosse Grenoblois . . . 8 00

NOVEMBER 19.

Gratuity: —
H. A. Wheeler, *Zygopetalum Mackayi* and *Cypripedium insigne* . 2 00

NOVEMBER 26.

Gratuity: —
J. E. Rothwell, Five plants Begonia Gloire de Lorraine . . . 5 00

DECEMBER 3.

Gratuity: —
H. A. Wheeler, Two Orchids 2 00

SILVER GILT MEDALS.

April 30. Oakes Ames, for Cypripedium Gertrude Hollington.
June 11. W. W. Lunt, for *Cattleya Morganiæ superba.*
Annual Exhibition of Fruits and Vegetables, September 29 and 30. Oakes Ames, for *Dracæna Godseffiana.*

SOCIETY'S SILVER MEDALS.

January 1. W. W. Lunt, for *Cypripedium bellatulum album.*
" 8. J. E. Rothwell, for *Odontoglossum Vuylstekeanum.*
" 29. Mrs. B. P. Cheney, for *Primula obconica grandiflora.*
March 19. W. W. Lunt, for Lælio-Cattleya Mrs. John D. Long.
April 16. J. E. Rothwell, for *Cypripedium niveum* var. *grandiflorum.*
May 14. J. E. Rothwell, for *Cypripedium bellatulum album.*
August 27. Oakes Ames, for *Cypripedium insigne* Laura Kimball.
Annual Exhibition of Plants and Flowers, August 31 and September 1.
H. H. Hunnewell, for *Asparagus Sprengeri.*
Yamanaka & Co., *Chamæcyparis obtusa nana.*

September 24. Oakes Ames, for Introduction of *Acalypha hispida*.
Annual Exhibition of Fruits and Vegetables, September 29 and 30.
J. E. Rothwell, for *Cypripedium insigne* var. *Sanderæ*.
Oakes Ames, for Seedling Cattleya.
George McWilliam, for New Seedling Dipladenia Elsa Whitin.
November 19. George McWilliam, for Three Seedling Cypripediums.
December 3. George McWilliam, for Five Seedling Dipladenias, including Dipladenia Elsa Whitin.

FIRST CLASS CERTIFICATES OF MERIT.

January 8. Joseph H. White, for *Begonia incarnata superba*.
" 22. Hon. C. G. Roebling, Trenton, N.J., for Cypripedium President McKinley.
" 29. Oakes Ames, for *Cattleya Trianæ* vars. *Amesiana* and *unicolor*.
February 19. W. W. Lunt, for *Cypripedium Lathamianum*.
" " James Comley, for Double Hybrid Prunus, from Japan.
March 5. R. & J. Farquhar & Co., for Narcissus Victoria.
April 16. J. E. Rothwell, for Cypripedium T. W. Bond.
" 30. W. W. Lunt, for *Oncidium Kramerianum*.
May Exhibition, May 7. J. E. Rothwell, for Phalænopsis Harrietta.
May 21. J. S. Bailey, for *Miltonia vexillaria Hilliana*.
June 18. Oakes Ames, for *Cattleya Mendelii* Mrs. A. C. Ames.
Rose and Strawberry Exhibition, June 23 and 24. J. B. Shurtleff, for new variety silver-leaved Pelargonium.
July 23. Robert Laurie, for Tropæolum Vesuvius.
August 6. Edward G. Uihlin, Chicago, Ill., for Display of Orchids.
Annual Exhibition of Fruits and Vegetables, September 29 and 30. Oakes Ames, for *Acalypha Godseffiana*.
October 22. Oakes Ames, for *Catasetum arachnoides*.
December 3. J. E. Rothwell, *Cypripedium insigne* var. *Schröderianum*.

HONORABLE MENTION.

January 22. Oakes Ames, for *Dendrobium Wardianum*.
April 23. J. E. Rothwell, for *Cypripedium leuchochilum*.
Rhododendron Show, June 7 and 8 (postponed from June 2 and 3). Walter Hunnewell, for Seedling Fuchsia Walter Hunnewell.
Rose and Strawberry Exhibition, June 23 and 24. W. E. Coburn, for Pelargonium Glendale.
September 24. Oakes Ames, for *Cypripedium Aspasia*.
October 29. R. & J. Farquhar & Co., for new Japanese Anemone.

AZELL C. BOWDITCH,
JAMES COMLEY,
JAMES WHEELER,
WILLIAM J. MARTIN,
ARTHUR H. FEWKES,
} *Committee on Plants.*

REPORT

OF THE

COMMITTEE ON FLOWERS,

FOR THE YEAR 1898.

By J. WOODWARD MANNING, CHAIRMAN.

Your Committee would report on the work of the year as follows:

The total amount of prizes awarded is a fair criterion of the year's exhibitions, which, on the whole, have not been as numerous nor the prizes as closely contested for as in other years. While the effect, from exhibition to exhibition, has seemed much the same as in years past, yet a careful survey of the results shows considerable falling off from previous years. This may be due largely to abnormal weather conditions, which have, to a certain extent, interfered with the successful growth of the flowers and with their coming to perfection in season to admit of their being staged at the time indicated by the schedule. The quality of the flowers shown compares very favorably indeed with past years, and those exhibitors who for many years past have been constant contributors seem to show as lively an interest as in the past, and the increasing excellence of their exhibits is noticeable.

To review the year's work somewhat in detail, we would state that a very excellent exhibition of Chinese Primroses, shown in flat dishes, was made January 8, and the display was particularly noticeable for the unusual variety of color, individual size, and variations in form shown by the various flowers. Joseph H. White carried off the first prize and Walter E. Coburn the second.

January 15 Oakes Ames showed an unusually fine variety of *Cattleya Trianæ* under the name of Lilian Chatman, for which a Silver Medal was awarded, and Hon. C. G. Roebling, of Trenton, N.J., was awarded a Silver Medal for a particularly unique form of *Cattleya Trianæ* under the varietal name of Clinkaberryana.

February 5 a unique display of Orchids was made by Oakes Ames, for which the first prize was awarded. Violets were shown in perfection by David Nevins and William C. Winter.

February 12 William Wallace Lunt was awarded a First Class Certificate of Merit for the new Cypripedium bearing his name.

March 12 R. & J. Farquhar & Co. showed a new Narcissus, var. Victoria; a very desirable, large-flowered kind, of which Honorable Mention was made. On this date Hon. C. G. Roebling was awarded a Silver Medal for *Cypripedium Rothschildianum*, Trenton variety.

SPRING EXHIBITION.

March 22 and 23.

The Spring Exhibition brought very close competition in forced Roses and Carnations. Particularly fine vases of Bridesmaid and The Bride Roses were shown, the prizes being competed for by William H. Elliott and Robert McGorum. Carnations and Violets were never shown to better advantage, and the prizes were closely competed for.

RHODODENDRON SHOW.

June 7 and 8 (postponed from June 2 and 3).

The Rhododendron Exhibition, owing to the coolness of the season, was postponed from June 2 and 3 to June 7 and 8, at which time a very creditable exhibition was made, although the competition was not as sharp as has been the case in former years. H. H. Hunnewell made a most remarkable exhibit of a great many varieties, occupying an entire table. Other principal exhibitors were James Comley and Dr. C. G. Weld. At this show a particularly fine display of Hybrid Aquilegias was made by Frederick S. Davis.

PÆONY SHOW.

June 18 (postponed from June 11).

The Pæony Exhibition was, of necessity, postponed from June 11 until June 18, at which time a most remarkable display was

made in the classes called for. Competition was very sharp, and altogether this proved one of the most interesting exhibitions of the year. Dr. C. G. Weld, T. C. Thurlow, and George Hollis were the principal competitors. R. & J. Farquhar & Co. made a particularly effective display of Hybrid Pyrethrums, for which a Silver Medal was granted. *Philadelphus Lemoinei*, a new hardy shrub exhibited by T. C. Thurlow, was awarded a First Class Certificate of Merit.

ROSE EXHIBITION.

JUNE 23 AND 24.

The Rose Exhibition of June 23 and 24, owing to weather conditions, proved quite disappointing. Many exhibitors, who under ordinary conditions would have competed closely, were unable to make entries. The peculiar conditions of weather that prevailed made it impossible for the Committee to judge as to the postponement of the exhibit to a later date, and it is doubtful whether any postponement would have improved matters, as cool weather and abundant rains, preceded by a very sharp hot spell, made conditions anything but favorable for the production of first-class roses. At this exhibition Robert Laurie, of Newport, R.I., exhibited a vase of Chrysanthemum Independence, which attracted attention, particularly on account of its abnormal season of bloom. He also made a display of Fringed Begonias, which combined a great range of color with form and size of bloom.

July 2 W. W. Lunt was awarded a First Class Certificate of Merit for a beautiful form of *Dendrobium thyrsiflorum* under the varietal name of *Hinghamense*. Hon. C. G. Roebling was also awarded a First Class Certificate of Merit for *Lælio-Cattleya Canhamiana alba*.

Hollyhocks were not in condition to show on July 7, and subsequent exhibitions of these flowers were not up to the usual standard.

Tuberous Begonias were shown to very good advantage on July 16, and competition was close between E. S. Converse and James L. Little.

The exhibition of Sweet Peas on July 23 was well staged and showed great improvement in variety over years past. The

flowers were in good condition, the competition was close, and altogether the general effect was all that could be desired.

Perennial Phloxes in the exhibition of July 30 were well shown and a continued improvement was noted in this class.

August 6 Rea Brothers made a particularly creditable show of *Veronica longifolia* var. *subsessilis*, which proves to be one of our hardiest perennials, combining sturdy habit of growth with prolific bloom of a particularly rich shade of blue. Gladioli were principally shown by J. Warren Clark, in well-grown spikes displayed to the best advantage.

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

August 20.

The Aquatic Exhibition on August 20 was confined mainly to a display made by Henry A. Dreer, of Philadelphia, who took the first prize in both entries. James Comley displayed a new Hybrid Magnolia, a cross between *Magnolia grandiflora* and *M. Soulangeana* (?), resulting in a form with evergreen foliage and a very large, intensely fragrant ivory-white flower. For this was awarded a Silver Medal. Henry A. Dreer was awarded a First Class Certificate of Merit for Cannas and Petunias; and the same for *Nymphæa Gladstoniana*.

August 27 J. Warren Clark was awarded Honorable Mention for a particularly effective yellow variety of Gladiolus, named Yellow Bird, and on this date he also made a creditable exhibition of other Gladioli.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

August 31 and September 1.

The exhibition of Dahlias at the Annual Show proved one of the most interesting of the year. Competition was very close, all classes being entered, and the merit of the individual flowers was all that could be desired. The exhibition attracted a great deal of attention and proved the Dahlia to be rising in popularity.

September 1 Jackson Dawson was awarded Honorable Mention for *Polygonum compactum*, a particularly desirable species, worthy of attention by cultivators in general.

September 10 Henry A. Dreer, of Philadelphia, was granted Honorable Mention for *Nymphæa Heusteriana*, a very promising new form.

September 17 George McWilliam was awarded Honorable Mention for a new seedling Dipladenia, Elsa Whitin. At the same time, and also on September 24 and October 1, Lothrop & Higgins made displays of Dahlias in various classes which were particularly well staged, showing a remarkable collection of varieties, and indicating the peculiar character and value of this class.

October 15 Hon. C. G. Roebling, of Trenton, N.J., was granted a Silver Medal for a unique and beautiful Orchid, *Dendrobium Phalænopsis* var. *Hololeuca;* also a First Class Certificate of Merit for *Cattleya labiata* var. *alba.*

October 29 Jackson Dawson was awarded a Silver Medal for *Euonymus Bungeanus*, which proves to be a most remarkable small, hardy tree, — the most remarkable that has been brought to the Hall for several years past. It is perfectly hardy, forming a large bush or small tree with slender branches which are quite enveloped with innumerable orange-red fruits with pink pericarps. Mr. Dawson also received the award of a First Class Certificate of Merit for *Ribes fasciculatum* var. *Chinensis*, a low bush with an abundance of the brightest cardinal-colored fruits.

R. & J. Farquhar & Co. exhibited a new double pink variety of *Anemone Japonica*, for which Honorable Mention was awarded.

CHRYSANTHEMUM EXHIBITION.

November 8, 9, 10, and 11.

While it would seem that in the last few years Chrysanthemum culture had reached its highest excellence, the present year proved that improvements have been made over the past. The specimen flowers were the finest that have ever been seen in our Hall, and altogether the Exhibition was a very marked success. It is very true that there was less competition in some of the classes than in past years, yet the entry into the field of new competitors shows that interest is not lacking and that future years will not fail to call forth close competition. The exhibitors were placed to some disadvantage by the early opening of the Hall, and it has been suggested that the opening hour of the first

day be set forward in order to give the exhibitors more time. The vases, in consequence of lack of time, were not as effective the first day as has been the case in other years. This matter was remedied later during the exhibition. The perfection to which specimen blooms have been brought, by careful cultivation, is marvellous, yet it seems that the principal exhibitors are still looking forward to additional laurels and great improvements in future years. These efforts on the part of our successful competitors will be watched with interest by your Committee, as well as by the public in general. At this exhibition Ernst G. Asmus, of West Hoboken, N.J., showed a large vase of the new Rose, Liberty, which created a great deal of enthusiasm, and seems particularly promising from its perfect shape, its intense color, and rich fragrance. Altogether, the indications are that this rose will prove exceedingly popular when introduced to the market.

November 19 Mr. George McWilliam exhibited a collection of seedling Dipladenias showing a great range of color in this valuable greenhouse plant, which would seem very promising for future use. A Silver Medal was given for the collection.

Native Plants.

Native plants were shown in unusual abundance by a number of competitors during the spring, summer, and autumn. Competition was very close — so close that at many times your Committee had to weigh their decisions with great care. A marked improvement is visible in the staging of the exhibits and the merits of the individual vases, as well as in the arrangement of the displays. Many rare plants were shown that were interesting from a botanical standpoint, and the best of the showy natives were not overlooked in any way. Competition has been more close in this particular class than in any other, and while the judgment of the Committee has been taken to task quite seriously by some of the exhibitors, absolute honesty in judgment has been the effort of your Committee.

Hardy Herbaceous Perennials.

These have not been shown to the same extent as in past years. It would seem particularly unfortunate that this has been the

case. The class is worthy of the greatest attention, as it includes some of the most effective plants of the garden. Their perennial character makes them especially desirable, while their effectiveness will bear comparison with any other class. Though the interest seems to have lessened from a competitive standpoint, yet we believe that this will be temporary and that other years will see a revival of active competition amongst exhibitors.

The amount appropriated for the year 1898 was .	$2,668 00
Awards of Prizes and Gratuities have been made to the amount of	2,065 00
Leaving an unexpended balance of	$603 00

Out of which medals, etc., are to be paid for.

All of which is respectfully submitted by your Committee.

J. Woodward Manning, *Chairman.*

PRIZES AND GRATUITIES AWARDED FOR FLOWERS.

1898.

JANUARY 8.

CHINESE PRIMROSES. — Display of fifty or more individual blooms:

First, Joseph H. White	$2 00
Second, W. E. Coburn	1 00

FREESIAS. — Vase of fifty spikes:

First, W. N. Craig	2 00
Second, Mrs. E. M. Gill	1 00

JANUARY 15.

Gratuities: —

Oakes Ames, collection of *Cattleya Trianæ*	4 00
James Comley, Display of Flowers	3 00

JANUARY 22.

Gratuity: —

James L. Little, *Bignonia diversifolia*	1 00

JANUARY 29.

Gratuity: —

James Comley, Display of Flowers	2 00

FEBRUARY 5.

ORCHIDS. — Display of named species and varieties, filling not less than twenty bottles:

First, Oakes Ames	15 00

VIOLETS. — Best collection of varieties, fifty blooms of each in a bunch:

First, David Nevins	4 00
Third, William C. Winter	2 00

CARNATIONS. — Display of cut blooms, with foliage, not less than six varieties, in vases:

First, William Nicholson	8 00
Second, M. A. Patten	6 00

CAMELLIAS. — Display of named varieties, cut flowers with foliage, not less than twelve blooms of not less than six varieties:

First, James Comley	4 00
Second, James Comley	3 00

Gratuities: —

James Comley, two pans of *Cœlogyne cristata*	2 00
E. A. & W. K. Wood, Display of Carnations	1 00
Mrs. E. M. Gill, Display of Flowers	2 00
C. E. Richardson, " " "	1 00

FEBRUARY 12.

Gratuity: —

James Comley, Display of Flowers 2 00

FEBRUARY 19.

Gratuities: —

James Comley, Display of Flowers 2 00
Mrs. E. M. Gill, " " " 1 00

FEBRUARY 26.

Gratuity: —

James Comley, Display of Flowers 1 00

MARCH 5.

Gratuity: —

Mrs. E. M. Gill, Display of Flowers 1 00

MARCH 12.

Gratuities: —

James Comley, Display of Flowers 5 00
Mrs. P. D. Richards, Native Plants 1 00

MARCH 19.

Gratuities: —

Edward Butler, Display of Orchids 1 00
Mrs. P. D. Richards, Native Plants 1 00

SPRING EXHIBITION.

MARCH 22, 23, 24, AND 25.

HYBRID PERPETUAL ROSES. — Twelve blooms, of not less than four named varieties:

First, C. H. Souther 12 00
Second, David Nevins 10 00

Six blooms, not less than three named varieties:

First, David Nevins 6 00
Second, C. H. Souther 5 00

Twelve blooms of Ulrich Brunner:

First, David Nevins 10 00

TENDER ROSES IN VASES. — Twenty-five blooms of Bridesmaid:

First, William H. Elliott 12 00
Second, Robert McGorum 10 00

Twenty-five blooms of The Bride:

First, William H. Elliott 12 00
Second, Robert McGorum 10 00

CARNATIONS. — Vase of one hundred cut blooms, with foliage, not less than six varieties:

First, M. A. Patten	8 00
Twenty-five blooms of any named Crimson variety:	
First, E. A. & W. K. Wood, for Ferdinand Mangold	3 00
Twenty-five blooms of any named Dark Pink variety:	
First, M. A. Patten, for William Scott	3 00
Second, E. A. & W. K. Wood, for William Scott	2 00
Twenty-five blooms of any named Light Pink variety:	
First, William Nicholson, for Daybreak	3 00
Second, E. A. & W. K. Wood, for Daybreak	2 00
Twenty-five blooms of any named Scarlet variety:	
First, F. A. Blake, for Bon Ton	3 00
Second, J. Tailby & Sons, for Wellesley	2 00
Twenty-five blooms of any named White variety:	
First, E. A. & W. K. Wood, for Uncle John	3 00
Second, M. A. Patten, for Edith Foster	2 00
Twenty-five blooms of any White Variegated variety:	
First, M. A. Patten, for Mrs. G. M. Bradt	4 00

PANSIES. — Forty-eight cut blooms, not less than twenty-four varieties, in flat dishes:

First, Estate of Joseph S. Fay	3 00
Second, C. H. Souther	2 00

VIOLETS. — Bunch of one hundred blooms of California:

First, David Nevins	3 00
Second, Harry S. Rand	2 00
Bunch of one hundred blooms of Lady Hume Campbell:	
First, David Nevins	3 00
Bunch of one hundred blooms of Marie Louise:	
First, David Nevins	3 00
Second, Harry S. Rand	2 00
Bunch of one hundred blooms of any other double variety:	
First, David Nevins, for Farquhar	3 00
Second, David Nevins, for Swanley White	2 00

ANTIRRHINUMS. — Display, not less than three varieties:

First, Mrs. John Jeffries	3 00
Second, Charles H. Souther	2 00

Gratuities: —

David Nevins, Display of Roses	10 00
Estate of Joseph S. Fay, Display of Pansies	1 00
F. W. Fletcher, Display of Violets	1 00
James Comley, Display of Flowers	10 00
James Garthley, " " "	3 00
Mrs. E. M. Gill, " " "	2 00

APRIL 2.

Gratuities: —

James Comley, Display of Flowers 2 00
Mrs. P. D. Richards, Native Plants 1 00

APRIL 9.

Gratuity: —

Mrs. P. D. Richards, Native Plants 1 00

APRIL 16.

Gratuity: —

Mrs. E. M. Gill, Display of Flowers 1 00

APRIL 23.

Gratuities: —

James Comley, Display of Flowers 2 00
Mrs. P. D. Richards, Display of Native Plants 1 00

APRIL 30.

Gratuity: —

Edward J. Mitton, Gloxinias 2 00

MAY EXHIBITION.

MAY 7.

TULIPS. — Forty-eight blooms, not less than twelve named varieties:
First, W. N. Craig 4 00
Second, Henry A. Wheeler 2 00
HARDY NARCISSUSES. — Collection of fifty vases of not less than ten named varieties:
First, Dr. C. G. Weld 8 00
Second, W. N. Craig 6 00
PANSIES. — Forty-eight blooms, not less than twenty-four varieties, in flat dishes
First, Estate of Joseph S. Fay 4 00
Second, Estate of Joseph S. Fay 3 00
Third, Estate of Joseph S. Fay 2 00
NATIVE PLANTS. — Collection of thirty bottles of named species and varieties, one bottle of each:
First, Mrs. P. D. Richards 8 00
Second, Misses Eleanor A. and Mollie S. Doran . . . 6 00
Third, Miss Genevieve Doran 4 00

Gratuities: —

William S. Eager, Display of Carnation Nivea 2 00
J. S. Bailey, Display of Carnation Daybreak 1 00
W. N. Craig, Display of Carnations and Pelargoniums . . . 1 00

Estate of Joseph S. Fay, Display of Pansies 2 00
John Jeffries, Display of Antirrhinums 1 00
Rea Brothers, Display of *Primula acaulis hybrida* 1 00
James Comley, Display of Flowers 3 00
Dr. C. G. Weld, " " " 3 00
Mrs. E. M. Gill, " " " 2 00
Miss Vivien May Norris, Native Plants 1 00
Joseph Anderson, " " 1 00

MAY 14.

Gratuities: —
Estate of Joseph S. Fay, Display of Pansies 5 00
James Comley, Display of Flowers 4 00
Mrs. E. M. Gill, " " " 2 00
Mrs. P. D. Richards, Native Plants 3 00
R. M. Puroes, " " 1 00

MAY 21.

HARDY PRIMULAS. — Display:
Second, Oakes Ames 2 00

Gratuities: —
J. S. Bailey, Display of Orchids 3 00
C. H. Souther, Gloxinias 2 00
James Comley, Display of Flowers 5 00
Mrs. E. M. Gill, " " " 2 00
Rea Brothers, " " " 2 00
H. A. Wheeler, " " " 1 00
Mrs. P. D. Richards, Native Plants 2 00

MAY 28.

Gratuities: —
Miss Vivien May Norris, Native Plants 2 00
Mrs. P. D. Richards, " " 2 00

JUNE 4.

Gratuity: —
H. H. Hunnewell, Display of Rhododendrons 8 00

RHODODENDRON EXHIBITION.

JUNE 7 AND 8 (POSTPONED FROM JUNE 2 AND 3).

H. H. Hunnewell Fund.

RHODODENDRONS. — Twelve distinct varieties of unquestioned hardiness, named:
First, James Comley 20 00
Six distinct varieties of unquestioned hardiness, named:
First, Dr. C. G. Weld 10 00
Single truss of any tender variety, named:
First, Dr. C. G. Weld 2 00

HARDY AZALEAS, FROM ANY OR ALL CLASSES. — Fifteen varieties, one vase of each:

First, James Comley	8 00
Second, Thomas C. Thurlow	5 00
Twelve varieties, one vase of each:	
Second, T. C. Thurlow	3 00
Six varieties, one vase of each:	
First, John L. Gardner	3 00
Cluster of trusses, one variety:	
First, T. C. Thurlow	2 00

Society's Prizes.

PÆONIA OFFICINALIS. — Collection of named varieties:	
First, T. C. Thurlow	6 00
TREE PÆONIES. — Collection of single and double varieties, named:	
First, T. C. Thurlow	6 00
GERMAN IRISES. — Fifty single blooms of not less than twelve varieties:	
First, John L. Gardner	4 00
ORIENTAL POPPIES. — Display:	
First, W. N. Craig	3 00
AQUILEGIAS. — Collection, twenty-five vases:	
First, Frederick S. Davis	3 00
Second, Joseph H. White	2 00
Third, Oakes Ames	1 00
HARDY ORNAMENTAL TREES AND SHRUBS. — Display of not less than thirty species and varieties, named, cut blooms or foliage:	
First, N. T. Kidder	8 00
Second, James Comley	6 00
Third, T. C. Thurlow	4 00
NATIVE PLANTS. — Collection of thirty bottles of named species and varieties, one bottle of each:	
First, George H. Grinnell	8 00
Second, Mrs. P. D. Richards	6 00
Third, Miss Genevieve Doran	4 00
VASE OF FLOWERS:	
First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities: —

H. H. Hunnewell, Display of Rhododendrons and Azaleas	25 00
Mrs. A. W. Blake, Display of Azaleas and Rhododendrons	5 00
James Comley, Display of Rhododendrons	5 00
James Comley, Display of Rhododendrons, etc.	5 00
Joseph H. White, Display of Gloxinias	3 00
Dr. C. G. Weld, Display of Flowers	6 00
Mrs. E. M. Gill, " " "	3 00

John L. Gardner, Display of Flowers	2 00
W. N. Craig, " " "	2 00
W. A. Manda, " " "	2 00
Rea Brothers, Display of Hardy Flowers	3 00
Miss Vivien May Norris, Display of Native Plants arranged for Effect,	4 00

JUNE 11.

Gratuities: —

Rea Brothers, Hardy Perennials	6 00
James Comley, Display of Flowers	10 00
Mrs. A. W. Blake, " " "	2 00
Mrs. E. M. Gill, " " "	2 00

PÆONY EXHIBITION.

JUNE 18 (POSTPONED FROM JUNE 11).

HERBACEOUS PÆONIES. — Collection of named varieties, double:	
First, T. C. Thurlow	12 00
Second, Dr. C. G. Weld	10 00
Third, George Hollis	8 00
Collection of named varieties, single:	
First, T. C. Thurlow	6 00
Second, George Hollis	5 00
Specimen Bloom:	
First, Dr. C. G. Weld, for Model of Perfection	2 00
Second, Dr. C. G. Weld, for Blanche Neige	1 00
Vase of Blooms on long stems, arranged for effect in the Society's large china vases:	
First, Dr. C. G. Weld	10 00
Second, George Hollis	8 00
Third, Mount Vernon Nursery	6 00
FOXGLOVES. — Twelve spikes:	
First, John L. Gardner	3 00
Second, Miss M. S. Walker	2 00
Third, W. N. Craig	1 00

Gratuities: —

Mrs. David Low, Display of Pæonies	1 00
Estate of Joseph S. Fay, Display of Rhododendrons	3 00
Mrs. E. M. Gill, Display of Roses	3 00
William H. Spooner, " " "	2 00
William Nicholson, Display of Carnations	3 00
Rea Brothers, Display of Pyrethrums	1 00
John L. Gardner, Display of Foxgloves	1 00
Rea Brothers, Display of Herbaceous Perennials	3 00

James Comley, Display of Flowers 12 00
W. N. Craig, " " " 3 00
Oakes Ames, " " " 2 00
Mrs. A. W. Blake, " " " 2 00
Mrs. E. M. Gill, " " " 2 00
G. L. Clarke, " " " 1 00
Mrs. P. D. Richards, Display of Native Plants 2 00
Miss Genevieve Doran, " " " " 1 00

ROSE EXHIBITION.

JUNE 23 AND 24.

Special Prizes, Theodore Lyman Fund.

HARDY ROSES. — Twenty-four distinct named varieties, three of each variety:
First, Estate of Joseph S. Fay 25 00

Society's Prizes.

Sixteen named varieties, three of each variety:
First, Estate of Joseph S. Fay 15 00
Twelve named varieties, three of each:
First, Joseph H. White 10 00
Second, Dr. O. S. Paige 3 00
Six named varieties, three of each:
First, Estate of Joseph S. Fay 6 00
Second, Mrs. A. W. Blake 4 00
Three named varieties, three of each:
First, Joseph H. White 3 00
Second, Estate of Joseph S. Fay 2 00
Twenty-four named varieties, one of each:
First, Dr. O. S. Paige 10 00
Second, Estate of Joseph S. Fay 8 00
Eighteen named varieties, one of each:
First, Joseph H. White 8 00
Second, Estate of Joseph S. Fay 6 00
Twelve named varieties, one of each:
First, Dr. C. G. Weld 6 00
Second, Joseph H. White 4 00
Third, Estate of Joseph S. Fay 2 00
Six named varieties, one of each:
First, E. S. Converse 4 00
Second, Joseph H. White 3 00
Third, Estate of Joseph S. Fay 2 00
Twenty-four blooms of Mme. Gabriel Luizet:
First, Estate of Joseph S. Fay 8 00
Second, Dr. O. S. Paige 6 00

Six blooms of Baroness Rothschild:
First, Mrs. A. W. Blake 3 00
Second, Dr. O. S. Paige 2 00
Six blooms of John Hopper:
Second, Dr. O. S. Paige 2 00
Twelve blooms of any other variety:
First, Dr. O. S. Paige 4 00
Second, Dr. C. G. Weld 3 00
Best single bloom of any variety:
First, Dr. O. S. Paige 2 00
Moss Roses. — Six named varieties, three clusters of each:
First, John L. Gardner 3 00
Second, Dr. C. G. Weld 2 00
General Display. — One hundred bottles of Hardy Roses, buds admissible, each exhibitor limited to one entry:
First, Mrs. E. M. Gill 10 00
Second, W. N. Craig 9 00
Third, Mrs. B. P. Cheney 8 00
Fourth, Dr. O. S. Paige 7 00
Fifth, Miss M. S. Walker 6 00
Sixth, John L. Gardner 5 00
Basket of Roses. — Arranged for effect, to be shown the second day:
First, Mrs. E. M. Gill 5 00
Sweet Williams. — Thirty spikes, not less than six varieties:
First, W. N. Craig 4 00
Second, Miss M. S. Walker 3 00
Third, Mrs. A. W. Blake 2 00
Spanish Irises. — Display:
First, John Jeffries 3 00
Second, Walter H. Cowing 2 00
Vase of Flowers. — Best arranged:
First, Mrs. E. M. Gill 5 00
Second, Miss Hattie B. Winter 4 00

Gratuities: —

Estate of Joseph S. Fay, Display of Roses 10 00
Mrs. E. M. Gill, " " " 3 00
William H. Spooner, " " " 2 00
Oakes Ames, Sweet Williams 1 00
T. C. Thurlow, Display of Pæonies 5 00
George Hollis, " " " 4 00
Estate of Joseph S. Fay, " " " 3 00
T. C. Thurlow, " " " 1 00
Robert Laurie, Display of Fringed Begonias 5 00
W. E. Coburn, Display of Pelargoniums 1 00
John Jeffries, Foxgloves 1 00

Robert Laurie, Chrysanthemum Independence	1 00
W. N. Craig, Display of Flowers	6 00
James Comley, " " "	5 00
A. F. Estabrook, " " "	2 00
James Comley, Vase of Flowers	5 00
Rea Brothers, Hardy Flowers	2 00
Miss Vivien May Norris, Native Grasses	1 00
Mrs. P. D. Richards, Native Flowers	1 00

JULY 2.

IRIS KÆMPFERI. — Fifteen varieties, three of each, in vases:	
First, John L. Gardner	6 00
Six varieties, three of each, in vases:	
First, John L. Gardner	4 00
Second, Miss M. S. Walker	3 00
CAMPANULA MEDIUM. — Collection, not less than fifteen bottles:	
First, John L. Gardner	5 00
SWEET WILLIAMS. — Auricula-flowered, thirty spikes, of not less than six distinct varieties:	
Second, W. N. Craig	2 00
DELPHINIUMS. — Collection of twenty spikes, not less than five varieties:	
First, John L. Gardner	5 00
Second, Mrs. A. W. Blake	4 00
Third, Rea Brothers	3 00
HERBACEOUS PLANTS. — Thirty bottles:	
First, W. N. Craig	8 00
Second, Rea Brothers	6 00
Third, George L. Clark	4 00
VASE OF FLOWERS. —	
First, Miss Hattie B. Winter	4 00
Second, Mrs. E. M. Gill	3 00
Gratuities: —	
Mrs. B. P. Cheney, Display of Roses	3 00
Mrs. B. P. Cheney, Display of Gloxinias	3 00
George Hollis, Display of Geraniums	2 00
James Comley, Display of Flowers	8 00
W. N. Craig, " " "	2 00
Mrs. E. M. Gill, " " "	2 00
Miss Genevieve Doran, Display of Native Plants	2 00

JULY 9.

HOLLYHOCKS. — Single, twelve spikes:	
Second, John L. Gardner	3 00

NATIVE PLANTS. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each:

First, Mrs. W. S. Eager	8 00
Second, Misses Eleanor A. and Mollie S. Doran	6 00
Third, Miss Genevieve Doran	4 00

VASE OF FLOWERS. — Best arranged:

First, Miss Hattie B. Winter	4 00
Second, Mrs. E. M. Gill	3 00

Gratuities: —

E. Shepperd & Son, Display of Irises	1 00
R. & J. Farquhar & Co., Display of Lilies and Irises	2 00
W. N. Craig, Display of Phloxes and Roses	2 00
Rea Brothers, Display of Herbaceous Plants	2 00
Mrs. A. W. Blake, Display of Flowers	1 00
Miss Vivien May Norris, Native Plants	4 00

JULY 16.

TUBEROUS BEGONIAS. — Collection arranged with their own foliage, in flat dishes:

First, E. S. Converse	4 00
Second, James L. Little	3 00
Third, James L. Little	2 00

HARDY FERNS. — Collection of named species and varieties:

First, Miss Alice L. Grinnell	6 00

Gratuities: —

John L. Gardner, Display of Hollyhocks	4 00
E. C. Lewis, " " "	1 00
W. N. Craig, Hollyhocks and Sweet Peas	3 00
R. & J. Farquhar & Co., Display of Lilies	4 00
James L. Little, Display of Gloxinias	3 00
Rea Brothers, Display of Hardy Perennials	1 00
Mrs. E. M. Gill, Display of Flowers	3 00
E. Sheppard & Sons, " " "	1 00
Misses Eleanor A. and Mollie S. Doran, Native Plants	2 00
Miss Alice L. Grinnell, Native Plants	1 00

JULY 23.

SWEET PEAS. — Display of named varieties, filling thirty vases, arranged with their foliage:

First, H. B. Watts	6 00
Second, F. A. Blake	4 00
Third, F. E. Chaffin	3 00

Display of named varieties in vases, six sprays in each vase:

First, H. B. Watts	4 00
Second, F. A. Blake	3 00
Third, W. H. Harrison	2 00

HERBACEOUS PLANTS. — Thirty bottles:

First, W. N. Craig	8 00
Second, Rea Brothers	6 00

VASE OF FLOWERS. — For table decoration:

First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities: —

A. S. Messer, Display of Hollyhocks	3 00
George Hollis, *Convolvulus palmata*	1 00
W. N. Craig, Display of Flowers	2 00
E. C. Lewis, " " "	2 00
Miss Alice L. Grinnell, Native Plants	1 00

JULY 30.

PERENNIAL PHLOXES. — Twelve named varieties, one spike of each:

First, Rea Brothers	3 00
Second, George Hollis	2 00

ANTIRRHINUMS. — Display of thirty vases, not less than ten varieties, three spikes of each:

First, William H. Lincoln	4 00
Second, John Jeffries	3 00

NATIVE FLOWERS. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each:

First, Mrs. W. S. Eager	8 00
Second, Mrs. P. D. Richards	6 00
Third, Miss Genevieve Doran	4 00

Gratuities: —

T. C. Thurlow, Phlox	2 00
John L. Gardner, Display of Flowers	3 00
Rea Brothers, " " "	2 00
James Comley, " " "	1 00
Mrs. E. M. Gill, " " "	1 00

AUGUST 6.

ANNUALS. — General display, named, filling not less than one hundred and fifty bottles:

First, John L. Gardner	10 00

Gratuities: —

Mrs. E. M. Gill, Display of Annuals	2 00
Rea Brothers, Display of *Veronica longifolia subsessilis*, Phlox, etc.,	4 00
R. & J. Farquhar & Co., Display of Auratum Lilies	3 00
E. S. Converse, Display of Tuberous Begonias	1 00
Mrs. P. D. Richards, Display of Native Plants	3 00
Miss Alice L. Grinnell, " " " "	2 00

AUGUST 13.

GLADIOLI. — Ten named varieties, in spikes:

First, J. Warren Clark	3 00
Second, John L. Gardner	2 00

Six varieties, named, in spikes:

First, J. Warren Clark	2 00

Display of named and unnamed varieties, filling one hundred vases, arranged for effect, with any foliage:

First, J. Warren Clark	8 00

MONTBRETIA. — Display in vases:

First, Bussey Institution	3 00
Second, John L. Gardner	2 00

PERENNIAL PHLOXES. — Collection of eighteen named varieties:

First, George Hollis	4 00
Second, Rea Brothers	3 00
Third, T. C. Thurlow	2 00

Gratuities: —

T. C. Thurlow, Display of Phlox	2 00
James Comley, Display of Flowers	3 00
R. P. Struthers, " " "	1 00
Mrs. E. A. Wilkie, " " "	1 00
Miss Alice L. Grinnell, Display of Native Plants	4 00
Misses Eleanor A. and Mollie S. Doran, Display of Native Plants	3 00
Mrs. P. D. Richards, Display of Native Plants	2 00

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

AUGUST 20.

Theodore Lyman Fund.

AQUATICS. — General display of Nymphæas, Nelumbiums, Sedges, Papyrus, and other aquatic plants, arranged for effect, to include not less than twenty-five blooms of Nymphæas:

First, Henry A. Dreer, Philadelphia	40 00

Display of twelve Nymphæas and Nelumbiums, named:

First, Henry A. Dreer	8 00

ASTERS. — Large Flowered, of all classes, fifty vases, not less than twelve varieties, three flowers in each vase:

First, C. H. Souther	6 00
Second, John L. Gardner	5 00

Truffaut's Pæony Flowered Aster, thirty blooms, not less than twelve varieties:

First, C. H. Souther	4 00

Victoria Flowered, thirty blooms, not less than twelve varieties:

First, C. H. Souther	4 00
Third, Mrs. A. W. Blake	2 00

HERBACEOUS PLANTS. — Thirty bottles:

First, W. N. Craig	8 00

Gratuities: —

J. Warren Clark, Display of Gladioli	3 00
William C. Winter, Display of Dahlias	2 00
John Parker, " " "	1 00
George Hollis, Collection of Phloxes	2 00
Rea Brothers, " " "	2 00
W. N. Craig, Cannas and Gloxinias	2 00
Bussey Institution, *Montbretia crocosmiflora*	1 00
James Comley, Display of Flowers	1 00
Miss Alice L. Grinnell, Native Plants	3 00
Mrs. P. D. Richards, " "	3 00
Misses Eleanor A. and Mollie S. Doran, Native Plants	1 00

AUGUST 27.

Gratuities: —

J. Warren Clark, Display of Gladioli	1 00
James Comley, Display of Flowers	2 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 31 AND SEPTEMBER 1.

DAHLIAS. — Show, eighteen blooms, named varieties:

First, H. F. Burt	4 00
Second, William C. Winter	3 00
Fancy, eighteen blooms, named varieties:	
First, H. F. Burt	4 00
Cactus, twelve blooms, named varieties:	
First, Lothrop & Higgins	4 00
Decorative, twelve blooms, named varieties:	
First, Lothrop & Higgins	4 00
Show, six blooms, named varieties:	
First, Lothrop & Higgins	2 00
Second, H. F. Burt	1 00
Fancy, six blooms, named varieties:	
First, H. F. Burt	2 00
Second, H. F. Burt	1 00
Best single bloom of any class, introduction of 1896, or later:	
Lothrop & Higgins	1 00
Pompon, twelve vases of three blooms each, named varieties:	
First, L. W. Snow	3 00
Second, William C. Winter	2 00
Third, H. F. Burt	1 00

General Display, all classes admissible, one hundred or more bottles:

First, W. W. Rawson & Co.	12 00
Second, William C. Winter	10 00
Third, Lothrop & Higgins	8 00
Fourth, H. F. Burt	6 00

HARDY LILIES. — Collection of named varieties:

First, Sumner Coolidge	4 00

TROPÆOLUMS. — Display, with their own foliage, filling twenty-five vases, not over twelve blooms of one variety in each:

First, Dr. C. G. Weld	3 00
Second, James L. Little	2 00

DOUBLE ZINNIAS. — Fifty flowers, not less than twelve varieties:

First, Dr. C. G. Weld	3 00
Second, James Comley	2 00

NATIVE PLANTS. — Collection, not exceeding forty bottles, of named species and varieties, one bottle of each:

First, Misses Eleanor A. and Mollie S. Doran	8 00
Second, Mrs. P. D. Richards	6 00
Third, Mrs. W. S. Eager	4 00

VASE OF FLOWERS. — For table decoration, on the last day of the exhibition:

Second, Mrs. E. M. Gill	3 00
Third, Miss Hattie B. Winter	2 00

Gratuities: —

R. & J. Farquhar & Co., Display of Cannas	2 00
J. W. Howard, Display of Cannas	1 00
J. Warren Clark, Display of Gladioli	2 00
Dr. C. G. Weld, Display of Asters	1 00
James L. Little, Display of Begonias	1 00
Rea Brothers, Display of Hardy Perennials	2 00
James Comley, Display of Flowers	3 00
Mrs. E. M. Gill, " " "	1 00
Miss Alice L. Grinnell, Display of Native Plants	1 00

SEPTEMBER 3.

Gratuity: —

Robert Laurie, Tuberous Begonias	1 00

SEPTEMBER 10.

HERBACEOUS PLANTS. — Thirty bottles:

First, W. N. Craig	8 00
Second, Rea Brothers	6 00

Gratuities: —

Lothrop & Higgins, Display of Dahlias	1 00
L. W. Goodell, Display of Phlox and Zinnias	1 00

L. W. Goodell, Display of Nymphæas 2 00
Mrs. E. M. Gill, Display of Flowers 1 00

SEPTEMBER 17.

PERENNIAL ASTERS. — Collection of Native or Introduced species and varieties:
First, Mrs. P. D. Richards 5 00
Second, Mrs. E. M. Gill 4 00
Third, Misses Eleanor A. and Mollie S. Doran 3 00

Gratuities: —
Lothrop & Higgins, Display of Cactus and Decorative Dahlias . 2 00
John F. Colan, *Celosia cristata* 1 00
James Comley, Display of Flowers 5 00
Rea Brothers, " " " 1 00

SEPTEMBER 24.

Gratuities: —
Lothrop & Higgins, Display of Show and Fancy Dahlias . . . 2 00
Mrs. E. M. Gill, Display of Dahlias 1 00

OCTOBER 1.

Gratuity: —
Lothrop & Higgins, Display of Dahlias 4 00

OCTOBER 15.

Gratuities: —
William C. Winter, Display of Dahlias 2 00
Mrs. E. M. Gill, " " " 1 00

OCTOBER 29.

Gratuity: —
James Comley, Display of Flowers 2 00

CHRYSANTHEMUM SHOW.

NOVEMBER 8, 9, 10, AND 11.

Special Prizes.

Josiah Bradlee Fund.

CHRYSANTHEMUMS. — Twenty-five blooms of twenty-five distinct varieties, named, a piece of plate, or value in money:
First, Mrs. B. P. Cheney 20 00
Second, Robert Laurie, Newport, R.I. 15 00
Third, David Nevins 10 00
Six vases of six named varieties, ten blooms each:
First, Waban Conservatories 30 00
Second, Mrs. B. P. Cheney 26 00
Third, David Nevins 20 00

Society's Prizes.

Twelve cut blooms, Incurved, named, in vases:
- First, Joseph H. White 8 00
- Second, C. H. Souther 6 00
- Third, Dr. C. G. Weld 4 00

Twelve cut blooms, Japanese Incurved, named:
- First, C. H. Souther 10 00
- Second, Mrs. B. P. Cheney 6 00
- Third, N. T. Kidder 4 00

Twelve cut blooms, Anemone, named, in vases:
- First, C. H. Souther 8 00
- Second, James L. Little 6 00
- Third, Dr. C. G. Weld 4 00

Six cut blooms, Incurved, named, in vases:
- First, C. H. Souther 5 00
- Second, Joseph H. White 4 00
- Third, John Jeffries 2 00

Six cut blooms, Japanese, named, in vases:
- First, C. H. Souther 6 00
- Second, Mrs. B. P. Cheney 4 00
- Third, James L. Little 2 00

Six cut blooms, Japanese Incurved, named, in vases:
- First, Joseph H. White 6 00
- Second, Mrs. B. P. Cheney 4 00
- Third, Edwin Whitin 2 00

Six cut blooms, Anemone, named, in vases:
- First, E. S. Converse 5 00
- Second, James L. Little 4 00
- Third, John Shepherd 2 00

Twelve sprays, Pompons, naturally grown, stems twenty-four inches or over, not less than six named varieties:
- First, William C. Winter 4 00

Twelve best varieties, named, introductions of the current year:
- First, J. W. Howard 8 00

Vase of ten blooms, on long stems, Pink, named:
- First, David Nevins 10 00
- Second, Robert Laurie 8 00
- Third, Robert Laurie 6 00

Vase of ten blooms on long stems, Red, named:
- First, David Nevins 10 00
- Second, Mrs. B. P. Cheney 8 00
- Third, Alexander Frazer 6 00

Vase of ten blooms, on long stems, White, named:
- First, Waban Conservatories 10 00
- Second, Mrs. B. P. Cheney 8 00
- Third, David Nevins 6 00

Vase of ten blooms, on long stems, Yellow, named:	
First, Waban Conservatories	10 00
Second, David Nevins	8 00
Third, Waban Conservatories	6 00
Vase of blooms on long stems, arranged in the Society's large china vases, to be kept in good condition during the exhibition:	
First, David Nevins	20 00
Second, C. H. Souther	18 00
Fifth, Miss Eleanor J. Clark	12 00
Best Seedling, never disseminated, six blooms, White:	
George Hollis, for Peerless	5 00
Best Seedling, never disseminated, six blooms, Yellow:	
Ernst G. Asmus, for Mrs. Trenor L. Park	5 00

Gratuities:—

Mrs. E. M. Gill, Display of Chrysanthemums	8 00
Mrs. B. P. Cheney, " " "	7 00
Mrs. B. P. Cheney, " " "	4 00
James Comley, " " "	6 00
S. J. Goddard, " " "	4 00
James Garthley, " " "	2 00
John Jeffries, " " "	1 00
H. Dumaresq, Two Vases of Chrysanthemums	6 00
David Nevins, " " " "	5 00
William W. Edgar, Vase of Chrysanthemum Mrs. Weeks	2 00
J. Fuller, Chrysanthemum Wachusett	2 00
Peter Fisher, Vase of Carnation Mrs. Thomas Lawson	2 00
J. W. Howard, Seedling Carnations	3 00
S. J. Goddard, Display of Carnations	1 00
Carl Jurgens, Vase of Rose Kaiserin Augusta Victoria	2 00
Dr. C. G. Weld, Collection	5 00

NOVEMBER 26.

Gratuity:—

James Comley, Display of Chrysanthemums	1 00

DECEMBER 3.

Gratuities:—

Mrs. E. M. Gill, Display of Flowers	2 00
James Comley, " " "	1 00

DECEMBER 24.

Gratuity:—

George Hollis, Collection of Geraniums	1 00

SOCIETY'S SILVER MEDALS.

January 15. Oakes Ames, for *Cattleya Trianæ* Lilian Chatman.
" " Hon. C. G. Roebling, Trenton, N.J., for *Cattleya Trianæ* var. *Clinkaberryana.*
March 12. Hon. C. G. Roebling, for *Cypripedium Rothschildianum*, Trenton variety.
Spring Exhibition, March 22–25. Peter Fisher, for Carnation Mrs. Thomas Lawson.
June 18. R. & J. Farquhar & Co., for Pyrethrums.
August 20. James Comley, for new Hybrid Magnolia.
October 15. Hon. C. G. Roebling, for *Dendrobium Phalænopsis* var. *Hololeuca.*
October 29. Jackson Dawson, for *Euonymus Bungeanus.*
Chrysanthemum Show, November 8–11. Ernst G. Asmus, for Rose Liberty.
November 19. George McWilliam, for Dipladenia Elizabeth K. Whitin.

KELWAY SILVER GILT MEDAL.

Pæony Exhibition, June 18. Dr. C. G. Weld, for the best collection of eighteen named varieties of *Pæonia albiflora*, single or double.

KELWAY BRONZE MEDAL.

Pæony Exhibition, June 18. T. C. Thurlow, for second best collection of eighteen named varieties of *Pæonia albiflora*, single or double.

FIRST CLASS CERTIFICATES OF MERIT.

February 12. W. W. Lunt, for Cypripedium William Wallace Lunt.
April 23. James E. Rothwell, for Cypripedium Eleanor Rothwell.
May 7. Hon. C. G. Roebling, for *Cypripedium Lawrenceanum* var. *Hyeanum.*
May 14. R. & J. Farquhar & Co., for *Narcissus bicolor* var. Victoria.
June 18. T. C. Thurlow, for *Philadelphus Lemoinei.*
July 21. W. W. Lunt, for *Dendrobium thyrsiflorum* var. *Hinghamense.*
" " Hon. C. G. Roebling, for *Lælio-Cattleya Canhamiana alba.*
August 20. Henry A. Dreer, for Cannas and Petunias.
" " Henry A. Dreer, for *Nymphæa Gladstoniana.*
October 1. Lothrop & Higgins, for Cactus Dahlias.
October 15. Hon. C. G. Roebling, for *Cattleya labiata* var. *alba.*
October 29. Jackson Dawson, for *Ribes fasciculatum* var. *Chinensis.*
" " R. & J. Farquhar & Co., for Salvia Sapphire.
November 9. Hon. C. G. Roebling, for *Renanthera Lowii.*
December 3. Hon. C. G. Roebling, for *Cypripedium Sanderianum.*

HONORABLE MENTION.

February 12. Hon. C. G. Roebling, for *Cattleya Trianæ* var. Emily M. Roebling.
March 12. R. & J. Farquhar & Co., for *Narcissus bicolor* var. Victoria.

Spring Exhibition, March 22-25. Frank Niquet, for Carnation Maud Adams.

Rose and Strawberry Exhibition, June 23 and 24. Jackson Dawson, for Seedling Roses.

August 20. J. Warren Clark, for Seedling Gladioli.

" " J. Warren Clark, for *Gladiolus Nanceianus* Seedlings.

August 27. J. Warren Clark, for Gladiolus Yellow Bird.

Annual Exhibition of Plants and Flowers, August 31 and September 1. Jackson Dawson, for *Polygonum compactum*.

September 10. Oakes Ames, for Collection of Hardy Nymphæas.

" " Henry A. Dreer, Philadelphia, for *Nymphæa Heusteriana*.

September 17. George McWilliam, for Dipladenia Elsa Whitin.

October 29. R. & J. Farquhar & Co., for new double blush Anemone Japonica.

Chrysanthemum Show, November 8-11. John H. Taylor, for Rose Admiral Dewey.

November 8-11. John H. Dunlop, for Rose Lady Dorothea.

J. WOODWARD MANNING,
MICHAEL H. NORTON,
KENNETH FINLAYSON,
FREDERICK S. DAVIS,
GEORGE E. DAVENPORT,
} *Committee on Flowers.*

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1898.

By E. W. WOOD, CHAIRMAN.

The fruit crop has been more evenly distributed among the different species the past season than usual. There has been no abundant crop of any kind except the strawberry, and there has been no marked failure of any of the varieties generally grown in this State.

Strawberries were evidently grown over a larger area than usual, and with favorable conditions the crop was so abundant that, excepting localities favorably situated as regarded markets, there was little or no profit to the growers. In a limited number of cases reported, where the receipts did not equal the expense for picking and marketing, the berries were not picked, but the vines were ploughed under, and the land utilized for other crops.

Reports from all parts of the State give the apple crop as yielding about forty-five per cent of the yearly average, this being the even or bearing year. There was a very full bloom on the trees, but the weather, while they were in blossom, was almost continually wet, and the set of fruit was scattering, and in some places an almost entire failure. While there was about half an average crop, the net receipts to the growers, owing to the higher prices received, were equal to those of 1896, when we had an exceedingly abundant crop, and the trees in many localities having received a rest the past year we may reasonably expect a larger crop of this fruit in 1899 than usual on the odd calendar year.

The exhibits during the year have been larger than usual, and the premiums were nearly all awarded.

No new varieties of fruits deserving special mention were shown, except in strawberries, where several varieties appeared for the first time, which upon further trial may prove desirable additions to those now in general cultivation. The increased exhibits of the Mackintosh apple indicate that it is coming into more general cultivation. It follows the Gravenstein and is a desirable market variety. Most of the fruit shown at the exhibitions is from those who grow for market, being selected specimens from ordinary orchard cultivation, comparatively few being grown specially for exhibition.

Sixteen hundred and seventy-five dollars have been awarded in prizes and gratuities, leaving an unexpended balance of fifty-seven dollars.

For the Committee,

E. W. WOOD,

Chairman.

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1898.

SPRING EXHIBITION.

March 22, 23, 24, and 25.

Winter Apples. — Baldwin:	
First, Mrs. A. W. Blake	$3 00
Second, C. L. Hartshorn	2 00
Third, George C. Rice	1 00
Northern Spy:	
First, William O'Connell	3 00
Second, George V. Fletcher	2 00
Roxbury Russet:	
First, H. R. Kinney	3 00
Second, Benjamin P. Ware	2 00
Third, C. L. Hartshorn	1 00
Tompkins King:	
First, George C. Rice	3 00
Any other variety:	
First, F. J. Kinney, Mackintosh	3 00
Second, George C. Rice, Fallawater	2 00
Third, C. L. Hartshorn, Rhode Island Greening	1 00
Winter Pears. — Any variety:	
First, George V. Fletcher, Anjou	3 00
Second, Warren Fenno, Duchess of Bordeaux	2 00
Strawberries. — One pint:	
First, E. S. Converse, Sharpless	3 00
Second, M. R. Cushing, Marshall	2 00

May 7.

Gratuities: —

William Brown, Peaches	2 00
William C. Winter, "	1 00
C. L. Hartshorn, Collection of Apples	2 00

May 14.

Gratuity: —

William Brown, Peaches	1 00

June 7.

Gratuities: —

E. S. Converse, Nectarines	1 00
William C. Winter, Grapes and Peaches	2 00

June 18.

Gratuities: —

William Doran & Son, Strawberries	2 00
W. N. Craig, "	1 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 23 AND 24.

Special Prizes from the Theodore Lyman Fund.

STRAWBERRIES. — Four quarts of any variety:

First, Warren Heustis & Son, for Marshall, the Lyman Plate, value	20 00
Second, Estate of Joseph S. Fay, for Marshall, the Lyman Plate, value	16 00
Third, A. M. Davenport, for Marshall, the Lyman Plate, value,	12 00
Fourth, Barnard Farm, " " " " " "	10 00
Fifth, Barnard Farm, for Clyde, the Lyman Plate, value	8 00

Special Prizes offered by the Society.

Two quarts of any variety, best adapted for garden cultivation for home use, to be judged by points:

First, Benjamin M. Smith, Margaret	6 00
Second, I. E. Coburn, Jessie	5 00
Third, Warren Heustis & Son, Marshall	4 00
Fourth, Estate of Joseph S. Fay, Marshall	3 00

Regular Prizes.

For the largest and best collection, not less than fifteen baskets of two quarts each, and not less than five varieties:

First, I. E. Coburn	20 00
Second, George F. Wheeler	15 00

Ten baskets of two quarts each, not less than three varieties:

First, George V. Fletcher	15 00
Second, I. E. Coburn	12 00
Third, George F. Wheeler	10 00

Five baskets, two quarts each, of one variety:

First, Warren Heustis & Son, Marshall	8 00
Second, William Doran & Son, "	6 00
Third, I. E. Coburn, Jessie	5 00
Fourth, George F. Wheeler, Clyde	4 00
Fifth, I. E. Coburn, Clyde	3 00

Two quarts of Belmont:

First, George V. Fletcher	4 00
Second, Warren Heustis & Son	3 00
Third, Mrs. A. W. Blake	2 00

Bubach:

First, Varnum Frost	4 00
Second, Warren Heustis & Son	3 00
Third, George V. Fletcher	2 00

Champion:

First, Barnard Farm	4 00
Second, George F. Wheeler	3 00

Charles Downing:	
First, William Doran & Son	4 00
Second, Miss M. S. Walker	3 00
Third, George F. Wheeler	2 00
Clyde:	
First, Barnard Farm	4 00
Second, George V. Fletcher	3 00
Third, Warren Heustis & Son	2 00
Crescent:	
First, I. E. Coburn	4 00
Second, William C. Winter	3 00
Third, George F. Wheeler	2 00
Cumberland:	
Third, George F. Wheeler	2 00
Haverland:	
First, I. E. Coburn	4 00
Second, Barnard Farm	3 00
Third, Levi Doran & Son	2 00
Hersey:	
First, George F. Wheeler	4 00
Jessie:	
First, I. E. Coburn	4 00
Second, George V. Fletcher	3 00
Third, William Christie	2 00
Leader:	
First, George F. Wheeler	4 00
Marshall:	
First, Varnum Frost	4 00
Second, Warren Heustis & Son	3 00
Third, Estate of Joseph S. Fay	2 00
Miner's Prolific:	
Second, George F. Wheeler	3 00
Third, Charles S. Smith	2 00
Parker Earle:	
First, I. E. Coburn	4 00
Second, George F. Wheeler	3 00
Any other variety:	
First, J. C. Haskell, Seedling	4 00
Second, George F. Wheeler, Enormous	3 00
Third, William C. Winter	2 00
Collection of not less than six varieties, one quart each:	
First, George V. Fletcher	8 00
Second, George F. Wheeler	6 00
One quart of any new variety, not previously exhibited:	
First, Estate of Joseph S. Fay	5 00
Second, Benjamin M. Smith	4 00

CHERRIES. — Two quarts of any variety:

First, O. R. Robbins	4 00
Second, Joshua C. Stone	3 00
Third, George V. Fletcher	2 00

FOREIGN GRAPES.— Two bunches of any variety:

First, E. S. Converse, Black Hamburg	6 00
Second, William C. Winter	4 00

FORCED PEACHES. — Six specimens of any variety:

First, William C. Winter, Waterloo	3 00
Second, William C. Winter, Hale's Early	2 00

JULY 2.

STRAWBERRIES. — Two quarts of any variety:

First, Warren Heustis & Son, Marshall	4 00
Second, Warren Heustis & Son, Belmont	3 00
Third, Benjamin M. Smith, Salem	2 00

CHERRIES. — Two quarts of Black Eagle:

First, E. S. Converse	3 00
Second, F. W. Damon	2 00
Third, Mrs. A. W. Blake	1 00

Black Tartarian:

First, L. M. Chase	3 00
Second, Edwin Hastings	2 00
Third, George V. Fletcher	1 00

Coe's Transparent:

First, L. M. Chase	3 00
Second, John L. Bird	2 00
Third, Mrs. A. W. Blake	1 00

Downer:

First, M. W. Chadbourne	3 00

Any other variety:

First, George V. Fletcher, Guigne Noir	3 00
Second, M. W. Chadbourne, Governor Wood	2 00
Third, Charles B. Travis, Elton	1 00

JULY 9.

RASPBERRIES. — Two quarts of any variety:

First, Benjamin G. Smith, Franconia	3 00
Second, William Doran & Son, Antwerp	2 00

CURRANTS. — Two quarts of any Red variety:

First, W. N. Craig, Versaillaise	4 00
Second, W. N. Craig, Fay's	3 00
Third, E. A. Weeks, "	2 00
Fourth, Francis Blake, "	1 00

Two quarts of any White variety:

First, W. N. Craig, White Grape	3 00
Second, E. S. Converse, White Grape	2 00

GOOSEBERRIES. — Two quarts of any variety of American origin:

First, W. N. Craig, Columbus	4 00
Second, W. N. Craig, Triumph	3 00
Third, Joseph S. Chase, "	2 00
Fourth, Mrs. A. W. Blake, Triumph	1 00

Gratuities: —

M. W. Chadbourne, Cherries	1 00
John L. Bird, "	1 00
A. T. Brown, "	1 00
Miss Vera Chapell, "	1 00
W. N. Craig, "	1 00
Warren Heustis & Son, Strawberries	1 00
William C. Winter, Peaches and Grapes	2 00

JULY 16.

RASPBERRIES. — Two quarts of any variety:

First, Miss E. J. Cutter	3 00
Second, William Doran & Son	2 00
Third, Benjamin G. Smith	1 00

CURRANTS. — One quart of any Red variety:

First, W. N. Craig, Versaillaise	3 00
Second, W. N. Craig, Fay's	2 00
Third, George V. Fletcher, Versaillaise	1 00

One quart of any White variety:

First, W. N. Craig, White Grape	2 00
Second, Mrs. A. W. Blake, White Grape	1 00

GOOSEBERRIES. — Two quarts of any foreign variety:

First, B. G. Smith, Hero of the Nile	4 00
Second, " " Ashton	3 00
Third, " " Eshender Bey	2 00
Fourth, " " Abbotsford	1 00

Gratuities: —

James L. Duncan, Cherries	1 00
W. N. Craig, "	1 00

JULY 23.

BLACKBERRIES. — Two quarts of any variety:

First, M. W. Chadbourne	3 00

APPLES. — Tetofsky:

First, H. K. W. Hall	3 00
Second, George Nelson	2 00

Yellow Transparent:

First, George Nelson	3 00
Second, William C. Winter	2 00

PEARS. — Summer Doyenne:

First, E. S. Converse	3 00
Second, L. M. Chase	2 00
Third, Joshua C. Stone	1 00

PEACHES. — Six of any variety:

First, William C. Winter	3 00

Gratuity: —

W. N. Craig, Currants	1 00

JULY 30.

APPLES. — Red Astrachan:

First, F. W. Damon	3 00
Second, J. L. Bird	2 00
Third, George C. Rice	1 00

Sweet Bough:

First, George V. Fletcher	3 00
Second, Charles B. Travis	2 00
Third, F. J. Kinney	1 00

Any other variety:

First, William C. Winter, Yellow Transparent	3 00
Second, H. K. W. Hall, Tetofsky	2 00
Third, Joshua C. Stone, Williams	1 00

PEARS. — Giffard:

First, Mrs. E. Emmons	3 00
Second, A. T. Brown	2 00
Third, Rufus T. Tobey	1 00

Any other variety:

First, J. L. Bird, Wilder	3 00
Second, Mrs. S. Klaus, Clapp's Favorite	2 00
Third, Joshua C. Stone, " "	1 00

BLACKBERRIES. — Two quarts of any variety:

First, E. C. Lewis	3 00
Second, M. W. Chadbourne	2 00
Third, H. A. Wheeler	1 00

PEACHES. — Outdoor culture, any variety:

First, N. D. Harrington	3 00
Second, George H. Sherwin	2 00

AUGUST 6.

APPLES. — Oldenburg:

First, J. V. Fletcher	3 00
Second, Sumner Coolidge	2 00
Third, Samuel Hartwell	1 00

Any other variety:

First, F. W. Damon, Red Astrachan	3 00
Second, Charles B. Travis, Sweet Bough	2 00
Third, Joshua C. Stone, Williams	1 00

PEARS. — Clapp's Favorite:

First, Sumner Coolidge	3 00
Second, A. T. Brown	2 00
Third, J. V. Fletcher	1 00

Any other variety:

First, Rufus T. Tobey, Giffard	2 00
Second, A. T. Brown, "	1 00

PEACHES. — Twelve specimens of outdoor culture, any variety:

First, Sumner Coolidge, Hale's Early	3 00
Second, George H. Sherwin, Hale's Early	2 00
Third, Warren D. Hinds, Alexander	1 00

Six specimens, cold house or pot culture:

First, William C. Winter, Crawford's Early	3 00
Second, William C. Winter, Crawford's Late	2 00

PLUMS. — Japanese, any variety:

First, W. D. Hinds, Burbank	3 00
Second, W. D. Hinds, Abundance	2 00
Third, W. D. Hinds, Satsuma	1 00

FOREIGN GRAPES. — Two bunches of any variety:

First, E. S. Converse, Black Hamburg	5 00
Second, William C. Winter, Black Hamburg	4 00

AUGUST 13.

APPLES. — Chenango:

First, Sumner Coolidge	3 00
Third, Samuel Hartwell	1 00

Summer Pippin:

First, Warren Fenno	3 00
Second, S. Hartwell	2 00

Williams:

First, Charles F. Curtis	3 00
Second, Joshua C. Stone	2 00
Third, Sumner Coolidge	1 00

Any other variety:

First, Warren Fenno, Red Astrachan	3 00
Second, F. W. Damon	2 00
Third, George V. Fletcher	1 00

PEARS. — Rostiezer:

First, E. S. Converse	3 00
Second, A. T. Brown	2 00
Third, M. W. Chadbourne	1 00

Tyson:

First, Warren Fenno	3 00
Second, John L. Bird	2 00

Any other variety:

First, Sumner Coolidge, Clapp's Favorite	3 00
Second, George V. Fletcher, " "	2 00
Third, A. T. Brown, " "	1 00

PEACHES. — Any variety:

First, Sumner Coolidge, Early Rivers	3 00
Second, G. L. Brown, Seedling	2 00

PLUMS, JAPANESE. — Abundance:

First, E. C. Lewis	3 00
Second, Warren D. Hinds	2 00
Third, Samuel Hartwell	1 00

Burbank:

First, W. D. Hinds	3 00

Gratuities: —

E. S. Converse, Apricots	1 00
T. C. Thurlow, Ohmer Blackberries	1 00

AUGUST 20.

APPLES. — Foundling:

First, C. M. Handley	3 00

Gravenstein:

First, Samuel Hartwell	3 00
Second, C. M. Handley	2 00
Third, George V. Fletcher	1 00

Maiden's Blush:

First, H. R. Kinney	3 00
Second, Joshua C. Stone	2 00
Third, E. S. Converse	1 00

Porter:

First, C. M. Handley	3 00
Second, S. Hartwell	2 00
Third, M. W. Chadbourne	1 00

Any other variety:

First, Varnum Frost, Williams	3 00
Second, Charles F. Curtis, Williams	2 00
Third, C. M. Handley, Fall Orange	1 00

PEARS. — Andrews:

First, E. S. Converse	3 00
Second, J. C. Stone	2 00

Bartlett:

First, Mrs. S. Klaus	3 00
Second, A. T. Brown	2 00
Third, Sumner Coolidge	1 00

Any other variety:

First, Mrs. S. Klaus, Clapp's Favorite	3 00
Second, Sumner Coolidge, " "	2 00
Third, A. T. Brown	1 00

PEACHES. — Single dish of any variety:

First, Sumner Coolidge, Early Rivers	3 00
Second, G. L. Brown, Seedling	2 00

PLUMS. — Bradshaw:
First, George V. Fletcher 3 00
Any other variety:
First, W. D. Hinds, Abundance 3 00
Second, E. C. Lewis, " 2 00
NATIVE GRAPES. — Winchell or Green Mountain:
First, H. R. Kinney 3 00
Second, Joseph S. Chase 2 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 31 AND SEPTEMBER 1.

Special Prizes from the Theodore Lyman Fund.

For the heaviest and best ripened bunch of any Foreign Black Grape:
Second, Miss E. J. Clark, Alicante 10 00
For the heaviest and best ripened bunch of any Foreign White Grape, Syrian excluded:
Second, E. S. Converse, Foster's Seedling 10 00

Society's Prizes.

FOREIGN GRAPES. — Two bunches of Black Alicante:
First, Miss E. J. Clark 5 00
Black Hamburg:
First, Miss E. J. Clark 5 00
Second, E. S. Converse 4 00
Third, William C. Winter 3 00
Golden Hamburg:
First, Miss E. J. Clark 5 00
Second, E. S. Converse 4 00
Muscat of Alexandria:
First, William C. Winter 5 00
Second, E. S. Converse 4 00
Any other variety:
First, E. S. Converse, Foster's Seedling 5 00
Second, E. S. Converse, Blue Chasselas 4 00

Gratuity: —
William C. Winter, Peaches 2 00

SEPTEMBER 10.

APPLES. — Garden Royal:
First, C. M. Handley 3 00
Gravenstein:
First, Samuel Hartwell 3 00
Second, George V. Fletcher 2 00
Third, E. M. Bruce 1 00

Maiden's Blush:
First, H. R. Kinney 3 00
Second, Warren Fenno 2 00
Third, Dr. W. G. Kendall 1 00
Porter:
First, George W. Stevens 3 00
Second, C. M. Handley 2 00
Third, Charles S. Smith 1 00
Pumpkin Sweet:
First, Samuel Hartwell 3 00
Second, G. W. Stevens 2 00
Third, John Parker 1 00
Washington Strawberry:
First, Sumner Coolidge 3 00
Second, Joshua C. Stone 2 00
Third, C. T. Foster 1 00
Any other variety:
First, W. D. Hinds, Wealthy 3 00
Second, Samuel Hartwell, Stump 2 00
Third, Samuel Hartwell, Somerset 1 00

CRAB APPLES. — Twenty-four specimens of Transcendent:
First, L. J. Fosdick 2 00
Any other variety:
First, C. L. Hartshorn, Hyslop 2 00
Second, Mrs. A. E. Mayell, Siberian 1 00

PEARS. — Bartlett:
First, Sumner Coolidge 3 00
Second, A. T. Brown 2 00
Third, Charles F. Curtis 1 00
Belle Lucrative:
First, C. E. Richardson 3 00
Second, Clifford R. Weld 2 00
Third, A. T. Brown 1 00
Boussock:
First, Sumner Coolidge 3 00
Second, Charles E. Swain 2 00
Third, A. M. Leavitt 1 00
Hardy:
First, Rufus T. Tobey 3 00
Second, William Milman 2 00
Third, Charles F. Curtis 1 00
Paradise of Autumn:
First, William Milman 3 00
Second, Warren Fenno 2 00
Third, Rufus T. Tobey 1 00
Souvenir du Congrès:
First, A. T. Brown 3 00

Second, William Christie	2 00
Third, Warren Fenno	1 00
Any other variety:	
First, A. T. Brown, Flemish Beauty	3 00
Second, A. T. Brown, De Tongres	2 00
Third, Charles E. Swain, Seckel	1 00
PEACHES. — Coolidge's Favorite:	
First, Joseph L. Duncan	3 00
Second, Warren D. Hinds	2 00
Third, Sumner Coolidge	1 00
Crawford's Early:	
First, W. D. Hinds	3 00
Second, E. M. Bruce	2 00
Third, Sumner Coolidge	1 00
Crosby:	
First, T. A. Greenleaf	3 00
Second, W. D. Hinds	2 00
Foster:	
First, Charles F. Curtis	3 00
Second, C. R. Safford	2 00
Third, Sumner Coolidge	1 00
Oldmixon Freestone:	
First, W. D. Hinds	3 00
Second, Sumner Coolidge	2 00
Third, Miss E. J. Cutter	1 00
Stump the World:	
First, G. L. Brown	3 00
Any other variety:	
First, W. D. Hinds, Elberta	3 00
Second, T. A. Greenleaf, Mountain Rose	2 00
Third, W. D. Hinds, " "	1 00
NECTARINES, OUTDOOR CULTURE. — Any variety:	
First, C. C. Donnell	4 00
Second, Warren Fenno	3 00
PLUMS. — Imperial Gage:	
First, Sumner Coolidge	3 00
Second, John Parker	2 00
Third, George V. Fletcher	1 00
Jefferson:	
First, Charles F. Curtis	3 00
Lombard:	
First, J. L. Bird	3 00
Second, L. M. Chase	2 00
Third, Joshua C. Stone	1 00
Any other variety:	
First, F. J. Kinney, Bradshaw	3 00
Second, Miss E. J. Cutter, Bradshaw	2 00
Third, George V. Fletcher, "	1 00

Japanese Plums, any variety:	
First, Sumner Coolidge, Burbank	3 00
Second, W. D. Hinds, Satsuma	2 00
Third, T. A. Greenleaf	1 00
NATIVE GRAPES. — Moore's Early:	
First, F. W. Damon	3 00
Second, H. R. Kinney	2 00
Third, Samuel Hartwell	1 00
Any other variety:	
First, E. C. Lewis, Lady Washington	3 00
Second, F. J. Kinney, Niagara	2 00
Any variety from girdled vines:	
First, F. J. Kinney, Worden	3 00
Second, H. R. Kinney, Delaware	2 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 29 AND 30.

Special Prizes from the Samuel Appleton Fund.

APPLES. — Baldwin, Sumner Coolidge	5 00
Hubbardston, E. M. Bruce	5 00
PEARS. — Bosc, Sumner Coolidge	5 00
Sheldon, A. T. Brown	5 00

Benjamin V. French Fund.

APPLES. — Gravenstein, Samuel Hartwell	5 00
Rhode Island Greening, C. L. Hartshorn	5 00

Marshall P. Wilder Fund.

PEARS. — Anjou:	
First, George V. Fletcher	4 00
Second, William Milman	3 00
Third, A. T. Brown	2 00
Fourth, F. W. Damon	1 00
Bartlett:	
First, Varnum Frost	4 00
Second, Charles F. Curtis	3 00
Third, George V. Fletcher	2 00
Fourth, Sumner Coolidge	1 00
NATIVE GRAPES. — Twelve bunches of Concord:	
First, H. R. Kinney	4 00
Second, William Doran & Son	3 00
Third, F. J. Kinney	2 00
Twelve bunches of Worden:	
First, F. J. Kinney	4 00
Second, H. R. Kinney	3 00

Theodore Lyman Fund.

APPLES. — Baldwin:	
First, C. L. Hartshorn	4 00
Second, John W. Clark	3 00
Third, Sumner Coolidge	2 00
Dutch Codlin:	
First, Warren Fenno	3 00
Second, Sumner Coolidge	2 00
Third, Joshua C. Stone	1 00
Fall Orange or Holden:	
First, Charles S. Smith	3 00
Second, H. R. Kinney	2 00
Third, C. M. Handley	1 00
Fameuse:	
First, Sumner Coolidge	3 00
Second, George V. Fletcher	2 00
Third, M. W. Chadbourne	1 00
Fletcher Russet:	
First, George V. Fletcher	3 00
Second, John Fletcher	2 00
Third, C. F. Curtis	1 00
Gloria Mundi:	
First, Samuel Hartwell	3 00
Second, E. M. Bruce	2 00
Golden Russet:	
First, George V. Fletcher	2 00
Second, H. R. Kinney	1 00
Gravenstein:	
First, Samuel Hartwell	4 00
Second, E. M. Bruce	3 00
Third, George Nelson	2 00
Hubbardston:	
First, C. L. Hartshorn	4 00
Second, John W. Clark	3 00
Third, E. M. Bruce	2 00
Hunt Russet:	
First, W. H. Hunt	3 00
Second, E. M. Bruce	2 00
Third, Samuel Hartwell	1 00
Jacobs Sweet:	
First, Charles F. Curtis	3 00
Second, M. Martin	2 00
Lady's Sweet:	
First, C. C. Shaw	2 00
Second, David L. Fiske	1 00
Mackintosh:	
First, F. J. Kinney	4 00

Second, Samuel Hartwell	3 00
Third, C. C. Shaw	2 00
Maiden's Blush:	
First, Warren Fenno	2 00
Second, H. R. Kinney	1 00
Mother:	
First, Warren Fenno	3 00
Second, H. R. Kinney	2 00
Third, George C. Rice	1 00
Northern Spy:	
First, C. L. Hartshorn	3 00
Second, George V. Fletcher	2 00
Third, Warren Fenno	1 00
Porter:	
First, Charles S. Smith	3 00
Second, Sumner Coolidge	2 00
Third, George V. Fletcher	1 00
Pound Sweet:	
First, George V. Fletcher	3 00
Second, George C. Rice	2 00
Third, Samuel Hartwell	1 00
Rhode Island Greening:	
First, C. C. Shaw	4 00
Second, Joshua C. Stone	3 00
Third, George V. Fletcher	2 00
Roxbury Russet:	
First, Mrs. E. J. Cutter	4 00
Second, Sumner Coolidge	3 00
Third, Jacob A. Leonard	2 00
Sutton:	
First, C. L. Hartshorn	3 00
Second, E. M. Bruce	2 00
Third, George C. Rice	1 00
Tolman's Sweet:	
First, W. P. Plimpton	3 00
Second, Jacob A. Leonard	2 00
Third, George Nelson	1 00
Tompkins King:	
First, George C. Rice	3 00
Second, J. A. King	2 00
Third, Samuel Hartwell	1 00
Washington Royal or Palmer:	
First, E. M. Bruce	3 00
Second, George C. Rice	2 00
Third, O. B. Hadwen	1 00
Wealthy:	
First, W. D. Hinds	3 00

Second, C. M. Handley	2 00
Third, George C. Rice	1 00
Any other variety:	
First, George C. Rice, Fallawater	3 00
Second, William Doran & Son, Bellflower	2 00
Third, Mrs. Mary T. Goddard, "	1 00
CRAB APPLES. — Hyslop, twenty-four specimens:	
First, W. D. Hinds	2 00
Second, M. W. Chadbourne	1 00
Any other variety, twenty-four specimens:	
First, F. J. Kinney	2 00

Special Prizes offered by the Society.

PEARS. — Anjou, Ellwanger & Barry	5 00
Seckel, A. T. Brown	5 00
PEACHES. — Any variety, Sumner Coolidge	5 00
NATIVE GRAPES. — Any variety, E. A. Adams	5 00

Society's Regular Prizes.

PEARS. — Angouleme:	
First, W. S. Janvrin	4 00
Second, A. T. Brown	3 00
Third, Mrs. E. Emmons	2 00
Fourth, F. W. Damon	1 00
Bosc:	
First, Charles E. Swain	4 00
Second, A. T. Brown	3 00
Third, Charles F. Curtis	2 00
Fourth, John C. Davenport	1 00
Clairgeau:	
First, Charles F. Curtis	3 00
Second, W. S. Janvrin	2 00
Third, Sumner Coolidge	1 00
Comice:	
First, A. T. Brown	3 00
Second, Mrs. E. Emmons	2 00
Third, Warren Fenno	1 00
Dana's Hovey:	
First, A. T. Brown	4 00
Second, Charles E. Swain	3 00
Third, George V. Fletcher	2 00
Fourth, A. C. Osborn	1 00
Diel:	
First, Charles E. Swain	3 00
Second, Mrs. E. Emmons	2 00
Third, A. T. Brown	1 00

Fulton:	
First, E. S. Converse	3 00
Second, S. F. & F. L. Weston	2 00
Hardy:	
First, Samuel Hartwell	3 00
Second, Rufus T. Tobey	2 00
Third, William Milman	1 00
Howell:	
First, Abram K. Gould	3 00
Second, Warren Fenno	2 00
Third, J. E. Fuller	1 00
Josephine of Malines:	
First, Warren Fenno	3 00
Second, David L. Fiske	2 00
Lawrence:	
First, Mrs. E. Emmons	3 00
Second, A. T. Brown	2 00
Third, L. M. Chase	1 00
Louise Bonne of Jersey:	
First, C. E. Richardson	3 00
Second, Mrs. James McCormick	2 00
Third, A. T. Brown	1 00
Marie Louise:	
First, Charles E. Swain	3 00
Second, Elbridge Torrey	2 00
Third, Warren Fenno	1 00
Merriam:	
First, Charles F. Curtis	3 00
Second, Sumner Coolidge	2 00
Third, F. W. Damon	1 00
Onondaga:	
First, Sumner Coolidge	3 00
Second, Charles B. Travis	2 00
Seckel:	
First, Charles E. Swain	4 00
Second, A. T. Brown	3 00
Third, Mrs. S. Klaus	2 00
Fourth, William Milman	1 00
Sheldon:	
First, A. T. Brown	4 00
Second, Elbridge Torrey	3 00
Third, Charles E. Swain	2 00
Fourth, Clifford R. Weld	1 00
St. Michael Archangel:	
First, Warren Heustis & Son	3 00
Second, Warren Fenno	2 00
Third, Benjamin G. Smith	1 00

Superfin:	
First, Mr. Ward	3 00
Second, Warren Fenno	2 00
Third, Sumner Coolidge	1 00
Urbaniste:	
First, Mrs. E. Emmons	3 00
Second, E. S. Converse	2 00
Third, A. T. Brown	1 00
Vicar:	
First, Mrs. Jones	3 00
Second, E. S. Converse	2 00
Third, A. T. Brown	1 00
Winter Nelis:	
First, A. T. Brown	3 00
Second, Clifford R. Weld	2 00
Third, Mrs. E. Emmons	1 00
Any other variety:	
First, Mrs. E. Emmons, Mount Vernon	3 00
Second, A. T. Brown, Souvenir du Congrès	2 00
Third, A. T. Brown, Flemish Beauty	1 00
Quinces. — Champion:	
First, George V. Fletcher	3 00
Second, Charles B. Travis	2 00
Orange:	
First, Arthur F. Coolidge	3 00
Second, George V. Fletcher	2 00
Third, Joshua C. Stone	1 00
Pear:	
First, G. L. Brown	3 00
Second, Benjamin G. Smith	2 00
Third, George V. Fletcher	1 00
Rea:	
First, Mrs. Mary T. Goddard	3 00
Second, Warren Fenno	2 00
Peaches. — Crawford's Late:	
First, Mrs. Mary T. Goddard	3 00
Second, N. D. Harrington	2 00
Third, E. M. Bruce	1 00
Any other variety:	
First, E. M. Bruce	3 00
Second, Sumner Coolidge	2 00
Third, T. A. Greenleaf	1 00
Plums. — Coe's Golden Drop:	
First, Abram K. Gould	2 00
Yellow Egg:	
First, George V. Fletcher	2 00

Any other variety:
First, W. D. Hinds 2 00
Second, T. A. Greenleaf 1 00

NATIVE GRAPES. — Six bunches of Brighton:
First, E. A. Adams 3 00
Second, Joseph S. Chase 2 00
Third, E. M. Bruce 1 00

Delaware:
First, H. R. Kinney 4 00
Second, F. W. Damon 3 00
Third, J. S. Chase 2 00

Herbert:
First, E. A. Adams 3 00
Second, J. S. Chase 2 00
Third, E. C. Lewis 1 00

Iona:
First, F. W. Damon 3 00
Second, J. S. Chase 2 00

Lindley:
First, Benjamin G. Smith 3 00

Niagara:
First, George A. Wills 3 00
Second, Frank G. Wellington 2 00
Third, J. S. Chase 1 00

Pocklington:
First, T. H. Jackman 4 00
Second, J. S. Chase 3 00
Third, Sumner Coolidge 2 00

Prentiss:
First, J. S. Chase 3 00
Second, Benjamin G. Smith 2 00

Wilder:
First, E. A. Adams 3 00
Second, Benjamin G. Smith 2 00
Third, E. C. Lewis 1 00

Any other variety:
First, John Parker 3 00
Second, H. R. Kinney 2 00
Third, J. S. Chase 1 00

Any variety from girdled vines:
First, H. R. Kinney 3 00
Second, F. J. Kinney 2 00

FOREIGN GRAPES. — Two bunches of any variety, cold-house culture:
First, Benjamin G. Smith 5 00
Second, E. S. Converse 4 00

CRANBERRIES. — Half-peck:
First, L. J. Fosdick 3 00

Gratuities : —

Samuel Hartwell, Gravenstein Apples	3 00
H. A. Wheeler, Collection of Apples	1 00
Warren D. Hinds, Edible Nuts	1 00
Warren Fenno, Collection	3 00
James Comley, "	2 00
M. W. Chadbourne, "	1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 5.

Benjamin V. French Fund.

APPLES. — Baldwin, C. F. Boyden	5 00
Rhode Island Greening, C. L. Hartshorn	5 00

Society's Prizes.

APPLES. — Baldwin:	
First, E. M. Bruce	3 00
Second, William C. Clapp	2 00
Third, C. L. Hartshorn	1 00
Danvers Sweet:	
First, Warren Fenno	3 00
Third, C. M. Handley	1 00
Fletcher Russet:	
First, George V. Fletcher	3 00
Second, Charles F. Curtis	2 00
Hubbardston:	
First, Amos T. Leavitt	3 00
Second, C. L. Hartshorn	2 00
Third, Samuel Hartwell	1 00
Hunt Russet:	
First, E. M. Bruce	3 00
Second, S. Hartwell	2 00
Third, Rev. C. Terry	1 00
Lady's Sweet:	
First, C. C. Shaw	3 00
Northern Spy:	
First, C. L. Hartshorn	3 00
Second, George V. Fletcher	2 00
Third, John L. Bird	1 00
Rhode Island Greening:	
First, Mrs. E. Emmons	3 00
Second, Warren Fenno	2 00
Third, William C. Clapp	1 00
Roxbury Russet:	
First, H. R. Kinney	3 00
Second, Mrs. E. J. Cutter	2 00
Third, Mrs. Mary T. Goddard	1 00

Tolman's Sweet:
First, Mrs. A. E. Underwood 3 00
Second, W. P. Plimpton 2 00
Third, C. C. Shaw 1 00
Tompkins King:
First, George C. Rice 3 00
Second, Samuel Hartwell 2 00
Third, C. L. Hartshorn 1 00
Any other variety:
First, C. C. Shaw, Bellflower 3 00
Second, F. J. Kinney, Mackintosh 2 00
Third, George V. Fletcher, Pound Sweet 1 00
PEARS. — Angouleme:
First, F. W. Damon 4 00
Second, A. T. Brown 3 00
Third, Mrs. E. Emmons 2 00
Fourth, F. J. Ward 1 00
Anjou:
First, Mrs. S. Klaus 4 00
Second, A. T. Brown 3 00
Third, William Milman 2 00
Fourth, Clifford R. Weld 1 00
Clairgeau:
First, Charles F. Curtis 3 00
Second, Warren Fenno 2 00
Third, F. W. Damon 1 00
Comice:
First, A. T. Brown 4 00
Second, Mrs. E. Emmons 3 00
Third, Warren Fenno 2 00
Fourth, John L. Bird 1 00
Dana's Hovey:
First, A. T. Brown 4 00
Second, Charles E. Swain 3 00
Third, J. L. Bird 2 00
Fourth, F. W. Damon 1 00
Diel:
First, Charles E. Swain 3 00
Second, Mrs. E. Emmons 2 00
Third, A. T. Brown 1 00
Glout Morceau:
First, Clifford R. Weld 3 00
Josephine of Malines:
First, Warren Fenno 3 00
Second, J. L. Bird 2 00
Third, Francis Blake 1 00

Langelier:	
First, Clifford R. Weld	3 00
Second, Mrs. S. Klaus	2 00
Third, A. T. Brown	1 00
Lawrence:	
First, L. M. Chase	3 00
Second, W. S. Janvrin	2 00
Third, Mrs. E. Emmons	1 00
Vicar:	
First, Mrs. Jones	3 00
Second, E. S. Converse	2 00
Winter Nelis:	
First, A. T. Brown	3 00
Second, Clifford R. Weld	2 00
Third, Mrs. E. Emmons	1 00
Any other variety:	
First, William Milman, Mount Vernon	3 00
Second, A. T. Brown, Sheldon	2 00
Third, Charles E. Swain, Bosc	1 00
FOREIGN GRAPES. — Two bunches of any variety:	
First, William C. Winter, Gros Colman	5 00
Second, Benjamin G. Smith, Muscat of Alexandria	4 00
Third, E. S. Converse, Alicante	3 00
Gratuities: —	
Willard Howard, Cranberries	3 00
L. J. Fosdick, "	2 00
Rev. C. Terry, "	1 00
James L. Duncan, Quinces	1 00

E. W. WOOD,
CHARLES F. CURTIS,
O. B. HADWEN,
WARREN FENNO,
SAMUEL HARTWELL,
J. WILLARD HILL,
SUMNER COOLIDGE,
} *Committee on Fruits.*

REPORT

OF THE

COMMITTEE ON VEGETABLES,

FOR THE YEAR 1898.

By CHARLES N. BRACKETT, CHAIRMAN.

Unusual weather conditions prevailed the past season, which was remarkable for its extremes of both heat and moisture. These conditions, while favorable to some classes of vegetables, in others, such as the squash and tomato, for instance, caused a rank and over-luxuriant growth of vines at the expense of the crop. On the whole, however, the exhibits throughout the year have been exceedingly satisfactory, and the number of contributors has increased. Prize exhibitions in this department commenced January 9, at which time there was a very fine show of forced vegetables in great variety, and again, on February 5, was an equally good exhibition with close competition for the prizes on both occasions.

At each Saturday following, up to the Spring Exhibition, liberal displays were made, the principal exhibitors being George D. Moore, Warren Heustis & Son, Arthur F. Coolidge, and James Comley.

The Spring Show, March 22 to 25, was excellent, and the same remark applies to the Rhododendron Show, June 7 and 8. At both of these exhibitions interesting displays of seasonable, well-grown vegetables were made, which were very creditable to the exhibitors. At the Spring Exhibition some excellent specimens of Mushrooms were shown by H. R. Kinney, A. W. Crockford, and I. E. Coburn, which were worthy of special mention; also Tomatoes, by W. C. Winter and Francis Blake.

The prizes for vegetables at the Rose and Strawberry Show, June 23 and 24, called forth a sharp competition from a large number of cultivators. George D. Moore was the largest contributor at this show and carried off a majority of first prizes. The quality and variety of his exhibits furnished ample evidence of his skill as a grower of fine vegetables. All the prizes scheduled were competed for and taken, and altogether this exhibition proved very satisfactory.

As the season advanced there was a corresponding improvement in quantity, quality, and variety of the objects offered in competition. Asparagus was late in making its appearance, and was not shown in the usual quantity. The first exhibit was made May 21, by William H. Hunt. The first Peas of the season were shown June 18, by Norris J. Comley. Tomatoes of open culture made their appearance for the first time July 9, C. L. Hartshorn and W. N. Craig being the exhibitors. The first prize award for Potatoes was made July 16, C. L. Hartshorn receiving the first prize. Sweet Corn was also shown for the first time at this exhibition, by Joshua C. Stone and Sumner Coolidge.

One of the largest and best shows of the season previous to the Annual was made at the closing of the weekly exhibitions, September 10. All the scheduled prizes were competed for and awarded. This show is always looked forward to as one of the most interesting of the season, and the present one fully sustained that reputation. The largest contributors were C. L. Hartshorn, H. R. Kinney, E. C. Lewis, and Warren Heustis & Son.

There has been no lack of enthusiasm manifested the past year by the exhibitors of Native Mushrooms during their season, and their exhibits have attracted crowds of interested visitors on each and every occasion.

After all that has been said about the large quantity of valuable food that is going to waste in the shape of edible Mushrooms, recent investigations made by Prof. L. B. Mendel, of Yale University, show that the nutritive value of the Mushroom is not so very high. "Science" describes Professor Mendel's experiment as follows: "Chemical analyses were combined with experiments in artificial digestion, and special attention was given to the amount of available (digestible) proteid present. The latter was found to be

not over two or three per cent in Mushrooms, which shows that the prevailing idea of the great nutritive value of Mushrooms is not yet justified. They may be valuable as dietetic accessories, but they do not deserve the term 'vegetable beefsteak.' Their nitrogen is largely in the form of non-proteid bodies. The amount of fat, cholesterin, soluble carbo-hydrates, crude fibre, and inorganic substances contained in them corresponds in general with that found in other vegetable foods, such as corn, peas, and potatoes."

The Annual Exhibition, all things considered, was undoubtedly one of the best we have ever made. The tables in the lower hall were fairly well filled. The show of Potatoes was not quite up in quantity to that of some former occasions, but the quality was excellent. F. J. Kinney took the first prize for the best four varieties. His specimens indicated careful culture on the part of the exhibitor, and attracted the attention of the visiting public by their uniformity and smoothness of growth.

The Schedule of Prizes for 1899 remains practically the same as that of the present year, very few changes having been made.

The amount appropriated for the year 1898 was . .	$1,200
Awards of prizes and gratuities have been made to the amount of	1,148
Leaving an unexpended balance of	$52

All of which is respectfully submitted.

For the Committee,

C. N. BRACKETT,

Chairman.

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1898.

JANUARY 8.

RADISHES. — Four bunches of any variety:

First, Arthur F. Coolidge	$3 00

CELERY. — Four roots:

First, Warren Heustis & Son, Boston Market	3 00
Second, Warren Heustis & Son, Pascal	2 00
Third, H. R. Kinney	1 00

LETTUCE. — Four heads of Tennisball:

First, George D. Moore	3 00
Second, George D. Moore, Rawson's Curly	2 00
Third, H. R. Kinney	1 00

PARSLEY. — Two quarts:

First, W. N. Craig	2 00
Second, H. R. Kinney	1 00

MUSHROOMS. — Twenty-four specimens:

First, H. R. Kinney	3 00
Second, E. S. Converse	2 00

TOMATOES. — Twelve specimens:

First, William C. Winter, Chemin	3 00
Second, William C. Winter, May's Favorite	2 00
Third, William C. Winter, Stone	1 00
Gratuities: —	
Mrs. A. W. Blake, Collection	2 00
Warren Heustis & Son, "	1 00

JANUARY 30.

Gratuities: —

Norris J. Comley, Radishes	1 00
Charles H. Hovey, South Pasadena, Cal., Tomatoes	1 00
Arthur F. Coolidge, Collection	2 00

FEBRUARY 5.

RADISHES. — Four bunches of any variety:

First, Joshua C. Stone	2 00
Second, Arthur F. Coolidge	1 00

SALSIFY. — Twelve specimens:

First, H. R. Kinney	3 00
Second, Warren Heustis & Son	2 00
Third, Mrs. A. W. Blake	1 00

CUCUMBERS. — Pair of any variety:

First, E. M. Bruce	3 00
Second, Francis Blake	2 00

CELERY. — Four roots:

First, E. M. Bruce, Boston Market	3 00
Second, Warren Heustis & Son	2 00
Third, E. M. Bruce, New Queen	1 00

LETTUCE. — Four heads of Tennisball:

First, Joshua C. Stone	3 00
Second, H. R. Kinney	2 00
Third, George D. Moore	1 00

MUSHROOMS. — Twenty-four specimens:

First, H. R. Kinney	3 00
Second, Francis Blake	2 00

RHUBARB. — Twelve stalks:

First, George D. Moore	3 00
Second, Charles F. Smith	2 00
Third, Mrs. A. W. Blake	1 00

TOMATOES. — Twelve specimens:

First, William C. Winter, Stone	3 00
Second, William C. Winter, May's Favorite	2 00
Third, William C. Winter, Chemin	1 00

Gratuities: —

Mrs. A. W. Blake, Collection	1 00
Warren Heustis & Son, "	1 00

FEBRUARY 12.

Gratuities: —

George D. Moore, Lettuce	1 00
Warren Heustis & Son, Celery	1 00

FEBRUARY 19.

Gratuities: —

Warren Heustis & Son, Celery	1 00
James Comley, Rhubarb	1 00

FEBRUARY 26.

Gratuities: —

Warren Heustis & Son, Celery	1 00
Arthur F. Coolidge, Collection	1 00
George D. Moore, "	1 00

MARCH 12.

Gratuities: —

George D. Moore, Lettuce	1 00
Arthur F. Coolidge, Collection	2 00

MARCH 19.

Gratuity: —

Arthur F. Coolidge, Collection	2 00

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1898.

JANUARY 8.

RADISHES. — Four bunches of any variety:

First, Arthur F. Coolidge	$3 00

CELERY. — Four roots:

First, Warren Heustis & Son, Boston Market	3 00
Second, Warren Heustis & Son, Pascal	2 00
Third, H. R. Kinney	1 00

LETTUCE. — Four heads of Tennisball:

First, George D. Moore	3 00
Second, George D. Moore, Rawson's Curly	2 00
Third, H. R. Kinney	1 00

PARSLEY. — Two quarts:

First, W. N. Craig	2 00
Second, H. R. Kinney	1 00

MUSHROOMS. — Twenty-four specimens:

First, H. R. Kinney	3 00
Second, E. S. Converse	2 00

TOMATOES. — Twelve specimens:

First, William C. Winter, Chemin	3 00
Second, William C. Winter, May's Favorite	2 00
Third, William C. Winter, Stone	1 00
Gratuities: —	
Mrs. A. W. Blake, Collection	2 00
Warren Heustis & Son, "	1 00

JANUARY 30.

Gratuities: —

Norris J. Comley, Radishes	1 00
Charles H. Hovey, South Pasadena, Cal., Tomatoes	1 00
Arthur F. Coolidge, Collection	2 00

FEBRUARY 5.

RADISHES. — Four bunches of any variety:

First, Joshua C. Stone	2 00
Second, Arthur F. Coolidge	1 00

SALSIFY. — Twelve specimens:

First, H. R. Kinney	3 00
Second, Warren Heustis & Son	2 00
Third, Mrs. A. W. Blake	1 00

CUCUMBERS. — Pair of any variety:

First, E. M. Bruce	3 00
Second, Francis Blake	2 00

CELERY. — Four roots:

First, E. M. Bruce, Boston Market	3 00
Second, Warren Heustis & Son	2 00
Third, E. M. Bruce, New Queen	1 00

LETTUCE. — Four heads of Tennisball:

First, Joshua C. Stone	3 00
Second, H. R. Kinney	2 00
Third, George D. Moore	1 00

MUSHROOMS. — Twenty-four specimens:

First, H. R. Kinney	3 00
Second, Francis Blake	2 00

RHUBARB. — Twelve stalks:

First, George D. Moore	3 00
Second, Charles F. Smith	2 00
Third, Mrs. A. W. Blake	1 00

TOMATOES. — Twelve specimens:

First, William C. Winter, Stone	3 00
Second, William C. Winter, May's Favorite	2 00
Third, William C. Winter, Chemin	1 00

Gratuities: —

Mrs. A. W. Blake, Collection	1 00
Warren Heustis & Son, "	1 00

FEBRUARY 12.

Gratuities: —

George D. Moore, Lettuce	1 00
Warren Heustis & Son, Celery	1 00

FEBRUARY 19.

Gratuities: —

Warren Heustis & Son, Celery	1 00
James Comley, Rhubarb	1 00

FEBRUARY 26.

Gratuities: —

Warren Heustis & Son, Celery	1 00
Arthur F. Coolidge, Collection	1 00
George D. Moore, "	1 00

MARCH 12.

Gratuities: —

George D. Moore, Lettuce	1 00
Arthur F. Coolidge, Collection	2 00

MARCH 19.

Gratuity: —

Arthur F. Coolidge, Collection	2 00

SPRING EXHIBITION.

MARCH 22, 23, 24, AND 25.

William J. Walker Fund.

RADISHES. — Turnip Rooted, four bunches:

First, Arthur F. Coolidge	2 00
Second, H. R. Kinney	1 00
Long Scarlet:	
First, H. R. Kinney	2 00
Second, Arthur F. Coolidge	1 00

CUCUMBERS. — White Spine, pair:

First, E. B. Smith	3 00
Second, E. M. Bruce	2 00

SPINACH. — Half-peck:

First, Warren Heustis & Son	2 00
Second, Hon. Aaron Low	1 00

DANDELIONS. — Peck:

First, Arthur F. Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, C. L. Hartshorn	1 00

LETTUCE. — Tennisball, four heads:

First, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, Arthur F. Coolidge	1 00

WATER CRESS. — Two quarts:

First, Arthur F. Coolidge	2 00

PARSLEY. — Two quarts:

First, C. L. Hartshorn	2 00
Second, H. R. Kinney	1 00

MUSHROOMS. — Twenty-four specimens:

First, H. R. Kinney	3 00
Second, A. W. Crockford	2 00
Third, I. E. Coburn	1 00

RHUBARB. — Twelve stalks:

First, George D. Moore	3 00

TOMATOES. — Twelve specimens:

First, Francis Blake	3 00
Second, William C. Winter, Stone	2 00
Third, William C. Winter, Chemin	1 00

Gratuities: —

Hon. Aaron Low, Potatoes	3 00
A. W. Crockford, String Beans	1 00
Benjamin P. Ware, Brussels Sprouts	1 00
M. W. Chadbourne, Artichokes	1 00
Warren Heustis & Son, Collection	2 00

APRIL 2.

PARSNIPS. — Twelve specimens:
First, Warren Heustis & Son 3 00
CUCUMBERS. — White Spine, pair:
First, E. B. Smith 3 00
Second, E. M. Bruce 2 00

Gratuities: —
E. M. Bruce, Celery, Queen 1 00
Rev. Calvin Terry, Squashes 1 00
Arthur F. Coolidge, Collection 2 00
Mrs. A. W. Blake, " 1 00
Hon. Aaron Low, " 1 00

APRIL 9.

Gratuity: —
James Comley, Mushrooms 1 00

APRIL 16.

Gratuities: —
George D. Moore, Lettuce 1 00
Warren Heustis & Son, Dandelions 1 00

APRIL 23.

Gratuity: —
Warren Heustis & Son, Lettuce 1 00

APRIL 30.

Gratuities: —
Mrs. E. M. Gill, Tomatoes 1 00
Warren Heustis & Son, Dandelions 1 00
Arthur F. Coolidge, Collection 1 00
George D. Moore, " 1 00

MAY EXHIBITION.

MAY 7.

William J. Walker Fund.

CUCUMBERS. — White Spine, pair:
First, Francis Blake 3 00
Second, Arthur F. Coolidge 2 00
Third, George D. Moore 1 00
SPINACH. — Peck:
First, Hon. Aaron Low 3 00
DANDELIONS. — Peck:
First, Warren Heustis & Son 2 00
Second, Arthur F. Coolidge 1 00

LETTUCE. — Four heads:

First, W. N. Craig	3 00
Second, C. L. Hartshorn	2 00
Third, Warren Heustis & Son	1 00

RHUBARB. — Twelve stalks:

First, Warren Heustis & Son	2 00
Second, Hon. Aaron Low	1 00

TOMATOES. — Twelve specimens:

First, Francis Blake, Best of All	3 00
Second, William Nicholson, Frogmore	2 00
Third, Francis Blake, Eclipse	1 00

Gratuities: —

Francis Blake, Tomatoes	1 00
Mrs. E. M. Gill, "	1 00
William Nicholson, Tomatoes	1 00
Arthur F. Coolidge, Beets and Cucumbers	1 00
W. N. Craig, Collection	3 00
Warren Heustis & Son, Collection	1 00

MAY 14.

Gratuity: —

Warren Heustis & Son, Collection	1 00

MAY 21.

Gratuities: —

W. H. Hunt, Asparagus	1 00
Norris F. Comley, Cucumbers	1 00
Warren Heustis & Son, Lettuce	1 00
Mrs. E. M. Gill, Tomatoes	1 00
William Christie, Cauliflowers	1 00

MAY 28.

Gratuities: —

Warren Heustis & Son, Collection	1 00
George D. Moore, "	1 00

JUNE 4.

Gratuities: —

George D. Moore, Collection	2 00
Warren Heustis & Son, "	1 00

RHODODENDRON EXHIBITION.

JUNE 7 AND 8 (POSTPONED FROM JUNE 2 AND 3).

Theodore Lyman Fund.

BEETS. — Twelve specimens, any variety:

First, C. L. Hartshorn	3 00
Second, Warren Heustis & Son	2 00

CARROTS. — Short Scarlet, twelve:
First, W. N. Craig, Sutton's Early 3 00
Second, W. N. Craig, Early Horn 2 00
RADISHES. — Turnip Rooted, four bunches:
First, Warren Heustis & Son 2 00
Second, George D. Moore 1 00
Long Scarlet:
First, George D. Moore 2 00
ASPARAGUS. — Four bunches, twelve stalks each:
First, W. H. Hunt 3 00
Second, C. L. Hartshorn 2 00
CUCUMBERS. — Pair:
First, George D. Moore, White Spine 3 00
Second, C. L. Hartshorn 2 00
Third, George D. Moore, Eureka 1 00
LETTUCE. — Four heads:
First, George D. Moore 3 00
Second, C. L. Hartshorn 2 00
RHUBARB. — Twelve stalks:
First, Warren Heustis & Son 3 00
Second, George D. Moore 2 00
Third, Hon. Aaron Low 1 00

Gratuities: —
William C. Winter, Tomatoes 1 00
Mrs. A. W. Blake, Rhubarb 1 00
James Comley, " 1 00
Warren Heustis & Son, Collection 2 00
George D. Moore, " 2 00
W. N. Craig, " 2 00

JUNE 11.

Gratuities: —
W. H. Hunt, Asparagus 1 00
Miss H. M. Noyes, Mushrooms 1 00

JUNE 18.

Gratuities: —
Estate of Joseph S. Fay, Lettuce 2 00
Warren Heustis & Son, " 1 00
W. H. Hunt, Asparagus 1 00
Norris F. Comley, Peas 1 00
Mrs. E. M. Gill, Tomatoes 1 00
William Doran & Son, Collection 2 00
W. N. Craig, " 1 00
George D. Moore, " 1 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 23 AND 24.

BEETS. — Summer Turnip Rooted, twelve:

First, C. L. Hartshorn	3 00
Second, Warren Heustis & Son	2 00
Third, Joshua C. Stone	1 00

ONIONS. — Twelve specimens:

First, George D. Moore	3 00
Second, C. L. Hartshorn	2 00
Third, Warren Heustis & Son	1 00

CUCUMBERS. — White Spine, pair:

First, George D. Moore	3 00
Second, Arthur F. Coolidge	2 00
Third, Joshua C. Stone	1 00

Any other variety:

First, W. N. Craig	3 00
Second, George D. Moore	2 00

CABBAGES. — Three of any variety, trimmed:

First, George D. Moore	3 00
Third, C. L. Hartshorn	1 00

LETTUCE.— Tennisball, four heads:

First, George D. Moore	3 00
Second, Warren Heustis & Son	2 00
Third, Joseph Thorp	1 00

Any other variety:

First, Warren Heustis & Son	2 00
Second, George D. Moore	1 00

PEAS. —Half-peck of any variety:

First, George D. Moore, Prosperity	3 00
Second, C. L. Hartshorn "	2 00
Third, Arthur Warburton "	1 00

Gratuities: —

William Christie, Carrots	1 00
George D. Moore, Collection	3 00
W. N. Craig, "	2 00
Norris F. Comley, "	1 00
Warren Heustis & Son, "	1 00

JULY 2.

ONIONS. — Twelve specimens:

First, George D. Moore	2 00
Second, C. L. Hartshorn	1 00

SQUASHES. — Long Warted, four:

First, C. L. Hartshorn	2 00
Second, Joshua C. Stone	1 00

Scalloped:
First, Joshua C. Stone 2 00
CABBAGES. — Three of any variety, trimmed:
First, George D. Moore, Early Spring 3 00
Second, George D. Moore, All Head 2 00
Third, C. L. Hartshorn 1 00
PEAS. — American Wonder, half-peck:
First, E. C. Lewis 3 00
Second, C. L. Hartshorn 2 00
Advancer:
First, C. L. Hartshorn 3 00
Any other variety:
First, George D. Moore, Prosperity 3 00
Second, C. L. Hartshorn, " 2 00
Third, E. C. Lewis, Nott's Excelsior 1 00

Gratuities: —
Mrs. E. M. Gill, Tomatoes 1 00
George D. Moore, Collection 2 00
E. C. Lewis, " 1 00
Warren Heustis & Son, " 1 00

JULY 9.

Levi Whitcomb Fund.

CABBAGES. — Three Drumhead, trimmed:
First, George D. Moore 3 00
Second, C. L. Hartshorn 2 00
BEANS. — Cranberry, half-peck:
First, Joshua C. Stone 3 00
Second, Samuel Hartwell 2 00
TOMATOES. — Open culture, twelve specimens:
First, C. L. Hartshorn 3 00
Second, W. N. Craig 2 00

Gratuities: —
Hon. Aaron Low, Potatoes 1 00
Warren Heustis & Son, Collection 1 00
W. N. Craig, " 1 00

JULY 16.

POTATOES. — Twelve specimens:
First, C. L. Hartshorn 3 00
Second, Francis Blake 2 00
Third, Hon. Aaron Low 1 00
LETTUCE. — Tennisball, four heads:
First, Warren Heustis & Son 2 00
Second, George D. Moore 1 00

Any other variety:
First, C. L. Hartshorn 2 00
PEAS. — Stratagem, half-peck:
First, I. E. Coburn 3 00
Second, C. L. Hartshorn 2 00
Any other variety:
First, E. C. Lewis, Carter's Daisy 3 00
Second, E. C. Lewis, Perfection 2 00
Third, I. E. Coburn, Queen 1 00
SWEET CORN. — Twelve ears:
First, Joshua C. Stone 3 00
Second, Sumner Coolidge 2 00
TOMATOES. — Open culture, twelve specimens:
First, C. L. Hartshorn, Acme 3 00
Second, Mrs. E. M. Gill, Stone 2 00
Third, Mrs. A. W. Blake 1 00

Gratuities: —
Hon. Aaron Low, Potatoes 1 00
Warren Heustis & Son, Collection 2 00
George D. Moore, " 2 00
W. N. Craig, " 1 00

JULY 23.

POTATOES. — Any variety, twelve specimens:
First, Francis Blake 3 00
Second, C. C. Marble 2 00
Third, Hon. Aaron Low 1 00
SWEET CORN. — Crosby, twelve ears:
First, Joshua C. Stone 3 00
Second, Samuel Hartwell 2 00
TOMATOES. — Twelve specimens:
First, Mrs. A. W. Blake 3 00
NATIVE MUSHROOMS. — Named collection of not less than five edible varieties:
First, Miss Ellen W. Rumrill 4 00
Second, Aldersey Clark 3 00
Third, Miss Alice L. Grinnell 2 00

Gratuities: —
George B. Gill, Golden Wax Beans 1 00
E. C. Lewis, Collection 2 00
Hon. Aaron Low, " 1 00
George Pfeiffer, " 1 00
Warren Heustis & Son, Collection 1 00

JULY 30.

BEANS. — Goddard, two quarts, shelled:
First, Warren Heustis & Son 3 00
Horticultural, two quarts, shelled:
First, Joshua C. Stone 3 00
TOMATOES. — Comrade, twelve specimens:
First, Arthur F. Coolidge 3 00
Second, Joshua C. Stone 2 00
Stone:
First, Arthur F. Coolidge 3 00
Second, Mrs. E. M. Gill 2 00
Any other variety:
First, C. L. Hartshorn, Acme 3 00
Second, Arthur F. Coolidge, Puritan 2 00
Third, Joshua C. Stone, Atlantic 1 00
EGG PLANTS. — Round Purple, four specimens:
First, H. R. Kinney 3 00
Second, Joshua C. Stone 2 00
Third, Arthur F. Coolidge 1 00

Gratuities: —
Warren Heustis & Son, Collection 2 00
E. C. Lewis, " 2 00
Arthur F. Coolidge, " 1 00
Hon. Aaron Low, " 1 00

AUGUST 6.

GREEN-FLESH MELONS. — Four specimens:
First, C. L. Hartshorn 3 00
SWEET CORN. — Twelve ears:
First, Sumner Coolidge 3 00
Second, Joshua C. Stone, Hybrid 2 00
Third, Joshua C. Stone, Crosby 1 00
EGG PLANTS. — Round Purple, four specimens:
First, Joshua C. Stone 2 00
Second, Sumner Coolidge 1 00

Gratuities: —
Samuel Hartwell, Sweet Corn 1 00
Hon. Aaron Low, Peas and Potatoes 1 00
G. S. Gray, Mushrooms 1 00
Warren Heustis & Son, Collection 1 00

AUGUST 13.

POTATOES. — Any variety, twelve specimens:
First, C. L. Hartshorn 3 00
Second, C. C. Marble 2 00
Third, Hon. Aaron Low 1 00

SALMON-FLESH MELONS. — Four specimens:

First, Hon. Aaron Low	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00

WATERMELONS. — Two specimens:

First, E. C. Lewis	3 00
Second, E. C. Lewis	2 00
Third, Hon. Aaron Low	1 00

CAULIFLOWERS. — Four specimens:

First, De Souza Brothers	3 00

LETTUCE. — Any variety, four heads:

First, Warren Heustis & Son	3 00
Second, C. L. Hartshorn	2 00
Third, Sumner Coolidge	1 00

CELERY. — Any variety, four roots:

First, Warren Heustis & Son	3 00
Second, Arthur F. Coolidge	2 00
Third, C. L. Hartshorn	1 00

PARSLEY. — Two quarts:

First, C. L. Hartshorn	2 00
Second, W. N. Craig	1 00

BEANS. — Large Lima, two quarts:

First, C. L. Hartshorn	3 00
Second, William Christie	2 00
Third, Mrs. E. M. Gill	1 00

CORN. — Sweet, Potter's Excelsior, twelve ears:

First, E. C. Lewis	3 00
Second, O. R. Robbins	2 00
Third, Joshua C. Stone	1 00

Any other sweet variety:

First, O. R. Robbins	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00

EGG PLANTS. — Round purple, four specimens:

First, C. L. Hartshorn	3 00
Second, H. R. Kinney	2 00
Third, Arthur F. Coolidge	1 00

TOMATOES. — Three varieties, twelve specimens each:

First, I. E. Coburn	5 00
Second, Arthur F. Coolidge	4 00
Third, Mrs. A. W. Blake	3 00

Aristocrat, twelve:

First, Varnum Frost	3 00
Second, Hon. Aaron Low	2 00
Third, Arthur F. Coolidge	1 00

Comrade:

First, Varnum Frost	3 00

Second, Francis Blake 2 00
Third, Hon. Aaron Low 1 00
May's Favorite:
First, Varnum Frost 3 00
Second, Francis Blake 2 00
Third, Mrs. A. W. Blake 1 00
Any other variety:
First, Varnum Frost, Stone 3 00
Second, Francis Blake 2 00
Third, H. R. Kinney 1 00
MARTYNIAS. — Twelve specimens:
First, E. C. Lewis 2 00
Second, Hon. Aaron Low 1 00
OKRA. — Twelve specimens:
First, E. C. Lewis 2 00
Second, E. C. Lewis 1 00
PEPPERS. — Squash, twelve specimens:
First, Hon. Aaron Low 2 00
Second, Arthur F. Coolidge 1 00
Any other variety:
First, E. C. Lewis 2 00
Second, C. L. Hartshorn 1 00

Gratuities: —
E. C. Lewis, Collection of Melons 2 00
Arthur F. Coolidge, Collection 2 00
W. N. Craig, " 2 00
Hon. Aaron Low, " 2 00
George D. Moore, " 1 00
Warren Heustis & Son, " 1 00

SEPTEMBER 17.

Gratuities: —
Warren Heustis & Son, Celery 1 00
James Comley, Tomatoes 1 00
Hon. Aaron Low, Melons 1 00

SEPTEMBER 24.

Gratuities: —
Warren Heustis & Son, Lettuce 1 00
Hon. Aaron Low, Melons 1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 29 AND 30.

BEETS. — Turnip Rooted, twelve:
First, Varnum Frost 3 00
Second, Joshua C. Stone 2 00
Third, C. L. Hartshorn 1 00

SALMON-FLESH MELONS. — Four specimens:

First, Hon. Aaron Low	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00

WATERMELONS. — Two specimens:

First, E. C. Lewis	3 00
Second, E. C. Lewis	2 00
Third, Hon. Aaron Low	1 00

CAULIFLOWERS. — Four specimens:

First, De Souza Brothers	3 00

LETTUCE. — Any variety, four heads:

First, Warren Heustis & Son	3 00
Second, C. L. Hartshorn	2 00
Third, Sumner Coolidge	1 00

CELERY. — Any variety, four roots:

First, Warren Heustis & Son	3 00
Second, Arthur F. Coolidge	2 00
Third, C. L. Hartshorn	1 00

PARSLEY. — Two quarts:

First, C. L. Hartshorn	2 00
Second, W. N. Craig	1 00

BEANS. — Large Lima, two quarts:

First, C. L. Hartshorn	3 00
Second, William Christie	2 00
Third, Mrs. E. M. Gill	1 00

CORN. — Sweet, Potter's Excelsior, twelve ears:

First, E. C. Lewis	3 00
Second, O. R. Robbins	2 00
Third, Joshua C. Stone	1 00

Any other sweet variety:

First, O. R. Robbins	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00

EGG PLANTS. — Round purple, four specimens:

First, C. L. Hartshorn	3 00
Second, H. R. Kinney	2 00
Third, Arthur F. Coolidge	1 00

TOMATOES. — Three varieties, twelve specimens each:

First, I. E. Coburn	5 00
Second, Arthur F. Coolidge	4 00
Third, Mrs. A. W. Blake	3 00

Aristocrat, twelve:

First, Varnum Frost	3 00
Second, Hon. Aaron Low	2 00
Third, Arthur F. Coolidge	1 00

Comrade:

First, Varnum Frost	3 00

Second, Francis Blake 2 00
Third, Hon. Aaron Low 1 00
May's Favorite:
First, Varnum Frost 3 00
Second, Francis Blake 2 00
Third, Mrs. A. W. Blake 1 00
Any other variety:
First, Varnum Frost, Stone 3 00
Second, Francis Blake 2 00
Third, H. R. Kinney 1 00
MARTYNIAS. — Twelve specimens:
First, E. C. Lewis 2 00
Second, Hon. Aaron Low 1 00
OKRA. — Twelve specimens:
First, E. C. Lewis 2 00
Second, E. C. Lewis 1 00
PEPPERS. — Squash, twelve specimens:
First, Hon. Aaron Low 2 00
Second, Arthur F. Coolidge 1 00
Any other variety:
First, E. C. Lewis 2 00
Second, C. L. Hartshorn 1 00

Gratuities: —
E. C. Lewis, Collection of Melons 2 00
Arthur F. Coolidge, Collection 2 00
W. N. Craig, " 2 00
Hon. Aaron Low, " 2 00
George D. Moore, " 1 00
Warren Heustis & Son, " 1 00

SEPTEMBER 17.

Gratuities: —
Warren Heustis & Son, Celery 1 00
James Comley, Tomatoes 1 00
Hon. Aaron Low, Melons 1 00

SEPTEMBER 24.

Gratuities: —
Warren Heustis & Son, Lettuce 1 00
Hon. Aaron Low, Melons 1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 29 AND 30.

BEETS. — Turnip Rooted, twelve:
First, Varnum Frost 3 00
Second, Joshua C. Stone 2 00
Third, C. L. Hartshorn 1 00

CARROTS. — Long Orange, twelve:
- First, H. R. Kinney 3 00
- Second, Walter Warburton 2 00
- Third, E. C. Lewis 1 00

Intermediate:
- First, H. R. Kinney 3 00
- Second, Varnum Frost 2 00
- Third, Walter Warburton 1 00

PARSNIPS. — Long, twelve:
- First, C. L. Hartshorn 3 00
- Second, George D. Moore 2 00
- Third, Varnum Frost 1 00

POTATOES. — Four varieties, twelve specimens each:
- First, F. J. Kinney 5 00
- Second, Mrs. Mary T. Goddard 4 00
- Third, E. C. Lewis 3 00

Carman No. 1:
- First, Mrs. Mary T. Goddard 3 00
- Second, Hon. Aaron Low 2 00

Clark:
- First, F. J. Kinney 3 00
- Second, Hon. Aaron Low 2 00
- Third, Mrs. Mary T. Goddard 1 00

Hebron:
- First, H. R. Kinney 3 00
- Second, F. J. Kinney 2 00
- Third, C. L. Hartshorn 1 00

Rose:
- First, H. R. Kinney 3 00
- Second, Mrs. Mary T. Goddard 2 00
- Third, B. J. De Souza 1 00

Any other variety:
- First, F. J. Kinney, Somerset 3 00
- Second, Arthur Nixon 2 00
- Third, Mrs. Mary T. Goddard 1 00

SALSIFY. — Twelve specimens:
- First, Warren Heustis & Son 3 00
- Second, E. C. Lewis, Sandwich Island 2 00
- Third, E. C. Lewis, Breck's Improved 1 00

TURNIPS. — Flat, twelve:
- First, F. J. Kinney 3 00
- Second, George F. Wheeler 2 00
- Third, E. C. Lewis 1 00

Swedish:
- First, C. L. Hartshorn 3 00
- Second, F. J. Kinney 2 00
- Third, E. C. Lewis 1 00

ONIONS. — Danvers, twelve:
- First, Charles F. Curtis 3 00
- Second, W. N. Craig, Globe 2 00
- Third, W. N. Craig, Flat Danvers 1 00

Red:
- First, W. N. Craig 3 00
- Second, Mrs. Mary T. Goddard 2 00
- Third, C. L. Hartshorn 1 00

White:
- First, W. N. Craig 2 00
- Second, E. C. Lewis 1 00

Any other variety:
- First, W. N. Craig, Ailsa Craig 3 00
- Second, W. N. Craig, Prize Taker 2 00
- Third, Mrs. Mary T. Goddard, Prize Taker 1 00

SQUASHES. — Bay State, three:
- First, Hon. Aaron Low 3 00
- Second, Sumner Coolidge 2 00
- Third, E. C. Lewis 1 00

Hubbard:
- First, Varnum Frost 3 00
- Second, Joshua C. Stone 2 00
- Third, Arthur F. Coolidge 1 00

Hybrid Turban:
- First, E. C. Lewis 3 00

Marblehead:
- First, E. C. Lewis 3 00
- Second, C. L. Hartshorn 2 00
- Third, Mrs. Mary T. Goddard 1 00

Marrow:
- First, Varnum Frost 3 00
- Second, C. L. Hartshorn 2 00
- Third, Arthur F. Coolidge 1 00

Any other variety:
- First, C. L. Hartshorn, Warren 3 00
- Second, Hon. Aaron Low 2 00
- Third, Hon. Aaron Low, Plymouth Rock 1 00

CUCUMBERS. — White Spine, pair:
- First, E. M. Bruce 3 00
- Second, William Doran & Son 2 00

Any other variety:
- First, Daniel T. Curtis 3 00
- Second, Hon. Aaron Low 2 00

MELONS, GREEN-FLESH OR SALMON-FLESH. — Four specimens:
- First, Hon. Aaron Low, Emerald Green 3 00
- Second, E. C. Lewis 2 00
- Third, Hon. Aaron Low, Christiana 1 00

WATERMELONS. — Two specimens:

First, E. C. Lewis	3 00
Second, Hon. Aaron Low	2 00
Third, E. C. Lewis	1 00

BRUSSELS SPROUTS. — Half-peck:

First, C. L. Hartshorn	3 00

CABBAGES. — Drumhead, three:

First, Mrs. Mary T. Goddard	3 00
Second, C. L. Hartshorn	2 00
Third, E. C. Lewis	1 00

Red:

First, Mrs. Mary T. Goddard	3 00

Savoy:

First, Mrs. Mary T. Goddard	3 00
Second, E. C. Lewis	2 00
Third, Joshua C. Stone	1 00

CAULIFLOWERS. — Four specimens:

First, B. J. De Souza	5 00
Second, Samuel Hartwell	4 00
Third, C. M. Handley	3 00

CELERY. — Paris Golden, four roots, best kept during the exhibition:

First, Warren Heustis & Son	5 00
Second, C. L. Hartshorn	4 00
Third, Arthur F. Coolidge	3 00

Any other variety:

First, E. M. Bruce, Pearl	5 00
Second, Warren Heustis & Son, Pascal	4 00
Third, C. L. Hartshorn, Pascal	3 00

ENDIVE. — Four specimens:

First, H. R. Kinney	3 00
Second, C. L. Hartshorn	2 00
Third, E. C. Lewis	1 00

LETTUCE. — Four heads:

First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00
Third, Sumner Coolidge	1 00

PARSLEY. — Two quarts:

First, W. N. Craig	2 00
Second, C. L. Hartshorn	1 00

HORSE-RADISH. — Six roots, present year's growth:

First, H. R. Kinney	2 00

CORN. — Yellow, or Field, twenty-five ears, traced:

First, Elliott Moore, eight rowed	3 00
Second, Elliott Moore, twelve rowed	2 00

Sweet, twelve ears:

First, O. R. Robbins	3 00
Second, Arthur F. Coolidge	2 00
Third, E. C. Lewis	1 00

EGG PLANTS. — Round Purple, four:

First, C. L. Hartshorn	3 00
Second, Arthur F. Coolidge	2 00
Third, Sumner Coolidge	1 00

TOMATOES. — Three varieties, twelve specimens each:

First, Arthur F. Coolidge	5 00
Second, H. R. Kinney	4 00
Third, Francis Blake	3 00
Aristocrat:	
First, Varnum Frost	3 00
Second, Arthur F. Coolidge	2 00
Third, Hon. Aaron Low	1 00
May's Favorite:	
First, E. M. Bruce	3 00
Second, Hon. Aaron Low	2 00
Third, Francis Blake	1 00
Stone:	
First, H. R. Kinney	3 00
Second, Thomas Appleford	2 00
Third, Arthur F. Coolidge	1 00
Any other variety:	
First, James Comley, New Champion	3 00
Second, A. T. Brown, Buckeye	2 00
Third, Arthur F. Coolidge, Comrade	1 00

PEPPERS. — Squash, twelve specimens:

First, George Lincoln	3 00
Second, Hon. Aaron Low	2 00
Third, C. L. Hartshorn	1 00
Any other variety:	
First, C. L. Hartshorn, Ruby King	3 00
Second, Hon. Aaron Low, "	2 00
Third, E. C. Lewis, "	1 00

CULINARY HERBS. — Collection, named:

First, W. N. Craig (green)	5 00
Second, C. L. Hartshorn (dried)	4 00

NATIVE MUSHROOMS. — Named collection, not less than five edible varieties (postponed from September 10):

First, Hollis Webster	3 00
Second, Miss Ellen W. Rumrill	2 00

Gratuities: —

Hon. Aaron Low, Collection of Potatoes	5 00
V. B. Hersom, Squashes	2 00
George E. Richardson, Gourds	1 00
Thomas Appleford, Collection of Corn	1 00
Mrs. Mary T. Goddard, Lima Beans	2 00
Thomas Appleford, " "	1 00

Mrs. E. M. Gill, Lima Beans	1 00
Warren Heustis & Son, Collection	5 00
W. N. Craig, "	5 00
E. C. Lewis, "	2 00
George D. Moore "	1 00

OCTOBER 8.

Gratuities : —

George D. Moore, Lettuce and Celery	2 00
Warren Heustis & Son, Celery	1 00

OCTOBER 15.

Gratuity : —

Warren Heustis & Son, Collection	2 00

OCTOBER 22.

Gratuities : —

Mrs. E. M. Gill, Lima Beans	1 00
Charles W. Parker, Sweet Potatoes and Peanuts	1 00
George D. Moore, Collection	1 00

OCTOBER 29.

Gratuity : —

Warren Heustis & Son, Collection	2 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 5.

PARSNIPS. — Twelve specimens :	
First, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, Arthur Nixon	1 00
CABBAGES. — Red, three specimens, trimmed :	
First, C. L. Hartshorn	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, Walter Warburton	1 00
Savoy :	
First, J. C. Stone	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00
BRUSSELS SPROUTS. — Half-peck :	
First, E. S. Converse	3 00
Second, C. L. Hartshorn, Improved	2 00
Third, C. L. Hartshorn, Paris Market	1 00
CAULIFLOWERS. — Four specimens :	
First, De Souza Brothers	3 00
Second, C. M. Handley	2 00
Third, E. C. Lewis	1 00

CELERY. — Four roots:	
First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00
Third, Arthur F. Coolidge	1 00
LETTUCE. — Four heads:	
First, Joshua C. Stone	3 00
Second, Warren Heustis & Son	2 00
Third, George D. Moore	1 00
TOMATOES. — Twelve specimens, grown under glass:	
First, William C. Winter	3 00
Second, Francis Blake, Best of All	2 00
Third, Francis Blake, Essex	1 00
Gratuities: —	
Mrs. Mary T. Goddard, Collections of Potatoes	2 00
Hon. Aaron Low, Collection of Squashes	2 00
L. H. Heustis, Squashes	1 00
James L. Duncan, Crosnes (*Stachys affinis*)	1 00
E. C. Lewis, Collection	4 00
Arthur Nixon, "	3 00
Warren Heustis & Son, Collection	2 00

NOVEMBER 12.

Gratuity: —	
Warren Heustis & Son, Celery	1 00

NOVEMBER 19.

Gratuities: —	
Hon. Aaron Low, Turnips	1 00
George D. Moore, Lettuce	1 00
George M. Anderson, Mushrooms	1 00

NOVEMBER 26.

Gratuity: —	
Warren Heustis & Son, Collection	1 00

DECEMBER 17.

Gratuity: —	
Warren Heustis & Son, Celery	1 00

CHARLES N. BRACKETT,
CEPHAS H. BRACKETT,
VARNUM FROST,
WARREN H. HEUSTIS,
P. G. HANSON,
WALTER RUSSELL,
AARON LOW,
} *Committee on Vegetables.*

REPORTS

OF THE

COMMITTEE ON GARDENS,

FOR THE YEARS 1897 AND 1898.

By PATRICK NORTON, CHAIRMAN.

REPORT FOR 1897.

[The accounts of the visits to the houses and grounds of Messrs. Nicholson, the Bussey Institution, Mr. Nevins, the Hayes estate, and Mrs. Cheney were prepared by Azell C. Bowditch, who acted as Chairman of the Committee at the time those places were visited.]

The year 1897, just closed, has been one of unusual activity with your Committee, as more calls for visits have been made than during the year just preceding. The applications during the first half of the year were but few, but as the summer advanced they came in so fast that we were quite busy till late into the fall.

We noticed on some of the places visited changes in the mode of planting. Hardy herbaceous and other flowering plants were more freely used than coleuses and other foliage plants, thereby giving more beauty to the landscape than the foliage alone. This, we think, is to be commended.

WILLIAM NICHOLSON & SON'S CARNATION HOUSES, FRAMINGHAM.

On March 18 we were invited to visit the carnation houses of William Nicholson and Son at Framingham. The particular house which they entered for the prize for the best carnation house is eighty-seven feet long by twenty-five feet wide. The carnations were in splendid condition, fully flowered, and showed by their

appearance that they received the very best of care and fully responded to it. As this class of plants is a specialty with this firm, all the promising new varieties are tried as soon as procurable, with a view to having the best in cultivation. They have been successful cultivators of the carnation.

While we were looking at the Messrs. Nicholson's carnations our attention was called to a house of tomatoes just coming into fruit. It was the finest house of tomatoes your Committee had ever seen. The Messrs. Nicholson were justly proud of their tomato house, and well they might be, for the financial result was very pleasing after the abundant crop was marketed. It was noticed that all the houses were uncommonly neat for commercial houses.

Bussey Institution of Harvard University, Jamaica Plain.

This was the next place visited, on March 27. Charles Jackson Dawson conducted us through the greenhouses, and explained as we passed along that the object of forcing hardy plants was to determine the length of time it would take to bring them into bloom from the dormant state, and also to have them in readiness for use in the school of botany. The plants were treated in three classes, viz., shrubs, herbaceous plants, and bulbs; and Mr. Dawson's letter in the Transactions of the Society for 1896 fully explains the whole matter.

David Nevins's Estate, South Framingham.

On the 15th of June we again visited this estate, which is entered for the Hunnewell Triennial Prize. As it is fully described in the report of last year, we will not take up time and space in going over the same ground again. We noticed on this visit that extensive improvements had been made, such as the transplanting of a great number of large elms and evergreens, which will in time add very much to the landscape effect.

The Francis B. Hayes Estate, Lexington.

Our next visit was to the Hayes estate in Lexington, on the 16th of June. This estate is in charge of James Comley, who has been superintendent of it from the time when Mr. Hayes came into possession. It received, some years ago, the

first Hunnewell Triennial Prize, but today it is yet more worthy of that prize, as with the lapse of time the beautiful shrubs and trees then planted have gone on towards perfection, and it now presents to the visitor a most charming sight. Mr. Comley has by judicious management and combination planting of shrubs and trees made this place a model of beauty for others to copy.

Mrs. Benjamin P. Cheney's Estate, Wellesley.

On the 2d of July we visited the large estate of Mrs. B. P. Cheney, just south of Wellesley. This estate has been so fully described in former reports of this Committee that it would be needless to repeat what has been said. It is a charming place, containing several hundred acres of land nearly surrounded by the Charles River, with fine driveways through the natural forests in every direction, making a carriage drive on this place much more enjoyable than on any public highway, even in the beautiful town of Wellesley.

Arthur F. Estabrook's Estate, Beach Bluff.

This estate is entered for the Hunnewell Triennial Prize, and this was our first visit. The place is a new one, situated on the corner of Phillips and Atlantic avenues; it is elevated land, and the elegant house overlooks the ocean. The grounds are judiciously planted with trees, shrubs, and flowers, and will in a few years present a charming appearance. We shall visit this place with renewed pleasure in the future, as we are confident it will continue to improve in beauty as the trees, etc., develop towards perfection.

Warren H. Heustis and Son's Vegetable Farm, Belmont.

This place was visited on the 15th of August. It is devoted to the growing of vegetables and fruits, and the raising of pigs. Mr. Heustis is an enthusiastic farmer and successful in his undertakings. On this farm originated the Belmont strawberry, which still holds its own place for size and excellence, equal to that of any other.

George A. Nickerson's Grape House, Dedham.

We were invited to visit this house on the 26th of August. It is

a large curvilinear-roofed house fully one hundred feet long by twenty-five feet wide, and is filled with grapevines. They were in a thrifty condition and in full bearing. The bunches were very even — none extremely large, but well-colored and carrying a fine bloom. The varieties are Black Hamburg, Muscat of Alexandria, Buckland Sweetwater, Bowood Muscat, Golden Hamburg, and others. We congratulate Mr. David Monteith, the gardener, on his success as a grape grower.

Sumner and Frank E. Coolidge's Farm, Mount Auburn.

Our next visit was to the Coolidge Farm, at Mount Auburn. This farm contains about one hundred acres mostly devoted to growing vegetables for the market. There are employed during the summer about one hundred Italians as laborers. Everything pertaining to the carrying on of the place is performed on the premises, and during the busiest seasons of the year seven teams are employed daily to carry the products to market. The proprietors have established a large irrigating plant, which is fed from driven wells, and the water is carried by pipes all over the farm, thereby avoiding drought, and producing good crops in the dryest of seasons. Their enterprise is to be commended.

Col. Frederick Mason's Farm, Taunton.

On the 9th of September your Committee paid a visit to the farm of Col. Frederick Mason, in Taunton, to inspect the vegetable garden which was entered for the prize for the best Vegetable Garden. This garden covers about five acres, and all the vegetables seen in our markets and others often mentioned in books, but seldom seen, were growing in abundance and of very superior quality. Mr. E. C. Lewis, the efficient gardener, said he planted about one hundred kinds of vegetables, and from their appearance he evidently kept them in the highest condition till maturity. This was one of the most enjoyable excursions of the year, as we were brought in contact with the perfection of general gardening on a liberal scale.

Warren D. Hinds's Peach Orchard, Townsend.

On September 17 we visited the peach orchards of W. D. Hinds at Townsend, in the northern part of the State. We found the

trees generally in good condition, with a few exceptions where the yellows seem to have developed. Mr. Hinds told the Committee how reluctant he was to thin out sometimes nearly half the fruit on a tree, but he was learning by experience that large fruit sells itself every time, when if all the fruit is left on it never acquires the fine appearance of that which is left after thinning.

Fred R. Mathieson's Greenhouses, Waltham.

On October 12 we were invited to visit the spacious greenhouses of Fred R. Mathieson at Waltham. These are chiefly devoted to the growing of roses. We found the houses well filled with plants in the finest condition and well bloomed. It is very evident that Mr. Mathieson knows how to grow roses in the best possible manner, and he profits from observation while on visits of inspection far and near to houses devoted to the same flower. We congratulate Mr. Mathieson on the success attending his efforts.

The Lenox Horticultural Society.

The Lenox Horticultural Society having invited the Garden Committee of the Massachusetts Horticultural Society to visit that famous town for a few days of restful pleasure, we departed from Boston on an early train on the thirteenth day of October, and arrived at Pittsfield, which is six miles from Lenox, at about noon. A delegation met us at the railroad station, and we were immediately conducted to a hotel, where an excellent dinner awaited and prepared us for the pleasant duties we had to perform. The prominent estates we were expected to visit comprised some of the most extensive in the State, and instead of the two days we spent inspecting a few of them we should want a month to do the pleasant work to our satisfaction. A four-horse carriage was at our service during the whole time of our stay, and a banquet was given to us in the evening. Though the country round about is hilly it does not present a rugged aspect, but on the contrary these beautiful hills have a charm and beauty all their own, and attract the wealthy from all over the country to recuperate in the health-giving atmosphere of the old Berkshire hills, after having become exhausted by the demands of society in other haunts of pleasure during summer.

Some of the estates comprise thousands of acres, and are laid

out in the most judicious manner with fine roads and walks of great extent, thus making a great private park of fully twenty-five square miles, studded with private residences palatial in character, of remarkable beauty and grandeur. It would seem out of place for us to describe any one estate among so many, and we will therefore confine ourselves to remarks giving a general idea of the scenery and the careful efforts of the gardener and architect in making the place so beautiful. One point which struck the Committee was the very short time in which these beautiful grounds had been developed from ordinary farming lands. Millions of money have been expended in the gradual improvement of this beautiful country, and the present result is a collection of private residences and specimens of landscape gardening that cannot be equalled elsewhere in all New England. A large number of these beautiful places have come into existence in this remarkable town, and a good many more are projected, each new proprietor trying to excel every one else in the generous expenditure of wealth in the building of a country home and the ornamentation of the already beautiful grounds.

Every such place as those above described requires the care of a competent head gardener, as well as a sufficient number of foremen and assistants, and it is probable that nowhere else in this country can an equal number of highly educated and skilful gardeners be found. The Horticultural Society of Lenox is not large in numbers, but this is more than made up by the accomplishments of its members and their expansive hospitality in entertaining their friends, and our visit to Lenox will long be remembered as one of the most delightful that the Garden Committee has ever made. The natural beauty of the place in the autumnal season was indescribable, for all nature had put on its most gorgeous colors to welcome us, which, together with the extreme hospitality of the gardeners, made us wish that our future lives might be cast in such a pleasant place as Lenox, and in such agreeable society as we met with there.

It has been a problem with many of the members of the Massachusetts Horticultural Society, who desire its utmost usefulness, how its influence could be extended so that it should be a State Society in reality as well as in name, and it is hoped that this visit may lead to such an extension of its usefulness.

Edmund M. Wood & Co.'s Greenhouses, Natick.

The twenty-eighth of October found your Committee at Natick, visiting the extensive greenhouses of Edmund M. Wood & Co. One of the houses, one hundred and fifty feet long by twenty feet wide and fourteen feet high, was devoted to the growing of chrysanthemums. There were in this house about four thousand plants, grown to a single stem, in about thirty varieties of the very best kinds in existence. Mr. Montgomery, the gardener, tests all the newly introduced and highly extolled kinds to see whether they are adapted to his wants, and if he finds them of sufficient merit to warrant, he continues to grow them afterwards. By this mode of procedure his house is filled with only the very best and most marketable kinds. He plants them in the same soil that he uses for growing roses, being very particular about drainage, as they require plenty of water continually applied. When they require stimulating, he feeds with commercial fertilizers in such quantities as in his good judgment and experience they need. So we see that there is no fast and loose way of growing anything under glass, but to be successful one must have knowledge and experience.

David Nevins's Chrysanthemum House, South Framingham.

On the twenty-ninth of October we again visited the David Nevins estate, to view his house of chrysanthemums planted on benches. These plants were grown to one flower, and presented a very thrifty appearance. The flowers were very large and well finished, and reflected great credit on the gardener, Alexander McKay, for the care he bestowed while they were growing.

William Nicholson & Son's Chrysanthemum House.

On the same day we again visited William Nicholson & Son's estate, to view a house of chrysanthemums grown on benches. We were highly pleased with the exhibition, for the plants were grown for one to three blooms to a plant, thereby giving more blooms than if all were grown singly. The market value of these medium-sized blooms is nearly as great as that of the giant blooms, and a great many more of them can be sold. The house presented a charming appearance.

Mrs. Benjamin P. Cheney's Chrysanthemums.

On the thirtieth of October we visited Mrs. B. P. Cheney's beautiful home at Wellesley, to see her splendid show of chrysanthemums. Mr. John Barr, the gardener, said he had about eight hundred single-stem plants on benches, comprising fifty varieties, and sixty-five ten-inch pots of specimen plants in thirty varieties. These were all of the very best kinds known, and they were a most beautiful sight to behold. As chrysanthemums vary greatly in the time they come into bloom, it will be well, if one wants a large lot to come into bloom at a given time, to know exactly whether they are early or late bloomers, so that he may plant accordingly.

The Eliot School Children's Chrysanthemum Exhibition, South Natick.

An unusual exhibition of chrysanthemums was made on November 11, 12, and 13 by the children of the Eliot School at South Natick, to which the Garden Committee were invited. In June, 1897, at the instance of T. D. Hatfield, gardener to Walter Hunnewell, one hundred and fifty plants were given to the school children by him and other gardeners to care for, grow, and bloom, and in the fall to bring forward for the exhibition. The prizes were given in Holland bulbs for house culture during the winter. The first prizes were seventeen bulbs each; second prizes, twelve bulbs; and all others six bulbs each. The children wrote their experiences, giving the life history of their plants, including their struggles with insects, mildew, etc. There is no doubt that such experience is valuable to a child, as it has a tendency to inculcate carefulness in horticulture, and foster a taste for the noble art which may be prolonged during the whole life. The practice of school exhibitions is to be heartily commended, and Mr. Hatfield and the teachers deserve much credit for originating this exhibition, at once educational and beautiful.

David Nevins's Violets.

The next visit made was on the second of December, to the David Nevins estate to view frames of violets. These were grown during the summer in rich garden soil near a hedge running north and south, and, in the early fall, transplanted to the frames. They showed no fungous disease, but were pictures of health and

splendidly flowered. Mr. McKay, the gardener, told us that the soil was composed of old sods and decayed leaves and very old manure, which produces a natural, cool soil, just such as the violet likes. He is very successful in their cultivation.

Sumner Coolidge's Violets.

On December 23 we visited the farm of Sumner Coolidge, to consider two houses of violets, one of Marie Louise, and the other Lady Hume Campbell. The plants had been placed in the ground the same as lettuce is planted. They were not in that very vigorous condition in which we like to see violets grown, but they were giving a large quantity of bloom of second quality, which supplied a certain demand. Violets, to produce fine blooms, must be grown luxuriantly, and they will sell on sight and command good prices.

The prizes and gratuities awarded during the year were as follows:

Special Prize from the John A. Lowell Fund.

For the best house of Chrysanthemums arranged for effect with other plants:	
First, Mrs. B. P. Cheney	$50 00

Society's Prizes.

For the best house of Foreign Grapes:	
First, George A. Nickerson	40 00
For the best house of Chrysanthemums grown on benches:	
First, Edmund M. Wood & Co.	50 00
Second, David Nevins	30 00
For the best bench or frames of Violets:	
First, David Nevins	40 00
Second, Sumner Coolidge	20 00
For the best Carnation house:	
First, William Nicholson & Son	40 00
For the best Fruit Garden:	
First, Warren D. Hinds	50 00
For the best Vegetable Garden:	
First, Col. Frederick Mason	50 00
Second, Sumner Coolidge	30 00

Gratuities.

Fred R. Mathieson, for Rose houses	25 00
James Comley, for frames of Russian Violets	20 00
Bussey Institution, for Spring Flowers	20 00
William Nicholson & Son, for house of Tomatoes	20 00
Eliot School, South Natick, for Chrysanthemums in pots	15 00

Amount appropriated		$500 00
Awarded for prizes	$400 00	
Awarded for gratuities	100 00	
		$500 00

Respectfully submitted,

PATRICK NORTON,
AZELL C. BOWDITCH,
J. WOODWARD MANNING,
E. W. WOOD,
CHARLES N. BRACKETT,
JOSEPH H. WOODFORD,
HENRY W. WILSON,
JACKSON DAWSON,

Committee on Gardens.

REPORT FOR 1898.

The year which has just closed has been, like the preceding, one of unusual activity for your Committee, for all the prizes in the Schedule have been competed for, and your Committee have made twenty-one visits to different places to view the results of intelligent horticulture as practised at the various places.

The David Nevins Estate, South Framingham.

In the year 1896 David Nevins, of South Framingham, entered his estate for the Hunnewell Triennial premium. This place has been visited twice a year since, the last visit occurring in November of this year. It consists of some five hundred acres, the greater portion of which is laid down to grass, but the area surrounding the mansion house, comprising about seventy-five acres, is kept in a superb closely shaven lawn interspersed with groups of trees, shrubs, and flower beds. Messrs. Ernest W. and James H. Bowditch were the landscape architects, with the coöperation of Alexander McKay, the permanent and efficient gardener on the place.

The situation of this estate is very beautiful, as it is divided by the Metropolitan Water Works, formerly the Sudbury River, which runs northerly through the middle of it, and joins Farm Pond on the east, thereby making the place a splendid park with grand water views in every direction. The old stone walls and fences have all been removed, the clumps of native forests have all been cleared up, and the driveways all over the five hundred acres are in most perfect order, making this estate one of the most charming and beautiful in the Commonwealth. This estate is awarded the First Hunnewell Triennial prize of $160.

During the past year, while Mr. Nevins was in Europe, where he went with the hope of improving his health, he died, much to the regret of all who knew him. He was a genial and companionable gentleman, and will be greatly missed by his family and by all who knew him, in all stations in life. *Requiescat in pace!*

GEORGE D. MOORE'S VEGETABLE FARM, ARLINGTON.

We also had the pleasure of visiting the farm of George D. Moore, at Arlington, on April 9 and July 26. This farm is entirely devoted to growing early and late vegetables, and several crops are taken from the same ground every year. Mr. Moore is a successful, hard-working farmer, applying experience and knowledge to accomplish good results in growing crops for market. His crops under glass as well as those outdoors were in fine condition, and deserved the award your Committee has made. We append Mr. Moore's letter explaining his mode of procedure.

ARLINGTON, April 9, 1898.

PATRICK NORTON, ESQ., *Chairman of Garden Committee:*

DEAR SIR: In compliance with your request I herewith send you some statistics and explanations of our market-garden operations.

We have some nine hundred hotbed sashes, which we use almost exclusively in raising lettuce, getting two crops in a season. We raise the plants, which take six to eight weeks to grow to the required size in our smallest greenhouse. Our first crop we transplant to the sash in February. We prepare the beds in the usual way in the fall, covering them four or five inches deep with strawy horse manure to keep out the frost. We cover them with the sash and shutters before the heavy snows. When ready to use the beds we take the covering for banking the sides of the hotbeds, then beginning at one end of the bed we shovel out the soil eight or ten inches deep from two sashes and fill in with heat (horse manure) to the depth of seven or eight inches when thoroughly packed or trodden down, then shovel the soil from the next two sashes back on this heat, and so continue to the end of the bed, after which we put the sashes back over the bed, covering at night with mats and shutters. In two or three days the soil will have been warmed by the under heat sufficiently to receive the plants. We then fork over the soil, breaking it fine, after which we rake in thoroughly about two pounds of Stockbridge Lettuce Special Fertilizer to each sash; then we pat down the surface with the back of a snow shovel to break the little lumps on top and keep the surface from drying till the plants cover the ground. We usually sprinkle the surface with tobacco dust, which we think has

a tendency to prevent mildew and ward off the lice pest, so troublesome to hotbed and greenhouse crops.

The management of the glass after planting can only be learned by education and experience. We have three greenhouses, the largest containing fourteen thousand lettuce plants, the next ten thousand, and the smallest about eight thousand, set eight inches apart. We usually raise three crops of lettuce in the houses, setting the first in October and harvesting the last in April, after which the houses are planted to cucumbers. The raising of lettuce in the greenhouse differs little from that in the hotbeds, with the exception of the under heat, which, for lettuce, is not necessary, but for cucumbers we make trenches fifteen inches wide and the same depth, and eight feet apart. In these trenches we put about a foot of well packed or trodden heat (horse manure), then cover with soil, and in a day or two when the soil is well warmed from the under heat we set two plants in hills three feet apart. These plants have been raised in six-inch flower-pots and should be six or eight inches high when transplanted. We usually fertilize the soil with Bowker Vine Fertilizer, say two pounds to eighteen square feet.

As in the management of hotbeds, it requires education and experience to make the business a success. If you desire I will give you a description of our management of the outside farming in a future letter.

Very truly yours,
GEO. D. MOORE.

GEORGE MARSTON WHITIN'S VINERY, WHITINSVILLE.

On August 10 we were invited to visit the vinery of George Marston Whitin, at Whitinsville, in the town of Northbridge, in the southern part of the State. This house is quite spacious, and is divided by a partition in the middle so as to enable the gardener to force one-half the house earlier than the other half, thereby extending the time of ripening. The house presented a grand appearance, the great bunches of grapes hanging in wonderful profusion, well colored, and of fine quality. Mr. George McWilliam, the gardener, deserves great credit for producing year after year such abundant crops of delicious fruit, and without any injury to the vines. A portion of the crop will not be consumed till next spring, the house thus furnishing a most refreshing fruit for eight

or nine months in the year. We have the pleasure of appending hereto Mr. McWilliam's method of growing foreign grapes, which is very instructive and well worth studying.

WHITINSVILLE, Dec. 30, 1898.

Mr. P. NORTON, *Chairman of Garden Committee:*

DEAR SIR: The graperies of G. M. Whitin are two span-roofed houses running east and west and heated with hot water. The vines were planted in May, 1885, with plants raised from eyes put in small pots in February. The young vines reached the top of the house early in July, were cut back to near the ground in December, carried their first crop of fruit in 1887, and have matured a heavy crop each year since. The borders are all inside, the bottom being cemented. Over the cement is placed a covering of cobblestones for drainage. The soil used was green sod, turned grass-side down, with broken bricks, charcoal, and old plaster to keep the soil open and sweet. The only manure used was broken bone. The soil is from twenty-four to thirty inches deep.

The early house, when planted, was all Hamburgs, but since planting there have been some Madresfield Court and Mrs. Pince inarched into the Hamburgs. The south side of the late house was planted with Muscats; the north side was planted with Alicante and Lady Downes.

The vines are pruned in December, the vines and houses well cleaned, the loose soil on the surface removed and replaced with fresh soil and a little fine bone. There being no plants kept in the vineries from now to the first of March, they are kept as cold as possible, but not to freeze the water in the pipes. About March 1 the borders receive two or three good waterings, the house is kept closed, and the vines started. The temperature is increased as the vines begin to grow. When in flower the Hamburg house is kept at about sixty-five degrees at night; the Muscat house at about seventy. Ventilating is carefully attended to. The vines are syringed from starting until they come into flower, and once after flowering. The borders are kept well saturated with water in the growing season, but never allowed to get dry at any time. When the fruit is swelling weak liquid manure is given.

Yours sincerely,

GEO. MCWILLIAM.

GREENHOUSES AND GROUNDS OF J. S. BAILEY, WEST ROXBURY.

We were called upon to visit the greenhouses and grounds of Jason S. Bailey, West Roxbury, on August 4. This place is quite new, not having been under cultivation more than three years, and yet it gives one, on close inspection, the feeling that a much longer time would not be too great to bring the whole place into such perfection of culture, and perform such judicious planting of flowers, trees, and shrubs. William Donald, the gardener, deserves much credit for the effective manner in which he has used the abundant means at his disposal.

ARTHUR F. ESTABROOK'S ESTATE, BEACH BLUFF.

In August your Committee visited the summer estate of A. F. Estabrook, at Beach Bluff. This estate is also entered for the Hunnewell Triennial premium, and this is the second year your Committee have inspected it. It comprises about four acres situated on a rise of ground overlooking the ocean. It is comparatively a new place, but has been reclaimed from what was within a few years nothing but a barberry pasture, but now presents a charming appearance, having been developed into a delightful summer home, such as any one would be delighted to occupy.

ESTATE OF E. S. CONVERSE, MALDEN.

August 24 your Committee were called to visit the old-fashioned estate of E. S. Converse, of Malden. The mansion is surrounded by fine old specimens of trees, giving the place an indescribable sense of comfort and restful enjoyment, and Mr. D. F. Roy, the efficient gardener, has been very successful in distributing among the trees such beautiful and large specimens of ornamental foliage and flowering plants as make the grounds very attractive. We were very glad to visit this place, as it is kept in complete order at all times and presents such a look of contentment that any one passing must desire to occupy one of the comfortable seats under the fine old trees and dream away a warm summer day in enjoyment.

COL. FREDERICK MASON'S RIVERSIDE FARM, TAUNTON.

On September 8 we again visited Riverside Farm, at Taunton, to view the vegetable garden of Col. Frederick Mason. This farm is one of the best conducted in the State, and is managed by one of

the most efficient farmer-gardeners, Mr. E. C. Lewis. It is a pleasure to see intelligence displayed in the care of stock and the cultivation of the ground, and here you find it in perfection. Our party was composed of the Garden Committee and a few of the best market gardeners of Arlington, and we heard the commendation of experienced men as to the success of Mr. Lewis's mode of cultivation. It was a pleasure to have our judgment confirmed by such good authority as our near-by successful farmers of Arlington, and it was also pleasant to partake of the excellent products of such a farm, under the hospitality of the owner and gardener.

Samuel Hartwell's Gravenstein Farm, Lincoln.

On September 13 we went to Lincoln to inspect the orchards of Mr. Samuel Hartwell. Mr. Hartwell turns his attention principally to the growing of apples, of the best kinds. His Gravensteins were bearing most abundantly, and indeed nearly all his trees presented a splendid sight. The cultivation of an orchard, if carried on intelligently, is probably as lucrative a business as a farmer can pursue. Mr. Hartwell has been very successful with his trees, and we imagine his success is entirely owing to the fact that he knows exactly what a tree needs to make it produce an abundance of good fruit, and to the prompt supply of its needs. He has named his farm from the apple most largely cultivated there.

Warren D. Hinds's Orchards, Townsend.

In September your Committee were called to visit the W. D. Hinds place, at Townsend, in the northern part of the State. This visit was to inspect the orchards on this place, which were composed of apple, plum, and peach trees. We were highly pleased with Mr. Hinds's farm, which was situated on very high ground, a capital place for fruit-growing, as early and late frosts do not, generally, affect orchards on high elevations so badly as those situated on low or level ground. Mr. Hinds was very successful this year, showing full crops of excellent fruit. His crop of peaches was enormous, and his plums — the Japanese variety, Satsuma — were of large size and most excellent quality.

Mrs. Benjamin P. Cheney, Sr's., Chrysanthemum House, Wellesley.

On the 2d of November we visited Mrs. B. P. Cheney's place at Wellesley, to inspect a house of chrysanthemums in pots arranged for effect, with other plants interspersed, thus making a very beautiful display. Mr. John Barr, the efficient gardener, exercised great good taste in his decoration, and your Committee were highly gratified with what they saw.

The Nevins Estate, South Framingham.

On November 3 we were called upon again to visit the David Nevins estate to view violets in frames and chrysanthemums on benches. The violets were of superior quality, consisting of five kinds, very profusely flowered and perfectly healthy. They were grown during the summer on the east side of a hedge, in good rich soil, and did not develop any fungous disease during their growth. The chrysanthemums on benches were grown to a single flower, and were of superior excellence. Mr. Alexander McKay's method of growing these two plants is to be commended, and it was a pleasure to witness the success of so good a gardener.

Edmund M. Wood & Co.'s Conservatories, Natick.

Our next visit, which occurred November 1, was to the Waban Conservatories at Natick. They are conducted by Edmund M. Wood & Co. The object was to view chrysanthemums on benches, and a rose house. Every one who has been at these greenhouses is struck with the very cleanly way in which everything is grown. Great credit is due to the gardener-superintendent, Mr. Alexander Montgomery, for his skill and knowledge in the noble art of horticulture, for in these greenhouses, covering many acres, we find only the highest cultivation, and perfect success is the result of his knowledge. We were very highly pleased with the whole establishment.

J. S. Bailey's Chrysanthemum House, West Roxbury.

We were called, on November 4, to the beautiful estate of J. S. Bailey, at West Roxbury, to inspect a house of chrysanthemums arranged with other decorative plants to produce the most pleasing effect. The greenhouse was a circular one, with a stage

around the inside of the whole house, elevated just enough to allow visitors to look down on the magnificent plants and beautiful arrangement to the best advantage. The plants were admirably grown, and the arrangement was exquisite, reflecting great credit on Mr. Bailey and his efficient gardener, Mr. William Donald. The Committee were highly gratified with their visit to Mr. Bailey's hospitable mansion and his beautiful greenhouses.

E. N. Peirce & Co.'s Greenhouses, Waltham.

On November 8 your Committee were called upon to visit a commercial place owned by E. N. Peirce & Co., of Waltham. This place, in the winter and spring, is devoted to growing vegetables for the market, but in the fall is filled with chrysanthemums for the same purpose. Messrs. Peirce & Co. marketed about seventy-five thousand blooms this fall, and when we visited the houses they were a superb sight to behold; the blooms were fine, well-developed, and of good size. They were cutting at that time from one to three hundred dozen blooms per day, and were getting good prices for them. One day they cut five thousand blooms.

George Marston Whitin's Orchid House, Whitinsville.

We had a cordial invitation again to visit the greenhouses of George M. Whitin, at Whitinsville, on December 20, to inspect a house of Calanthes which were in full bloom. Mr. George McWilliam, the experienced and successful gardener, had arranged the orchids among beautiful foliage plants, and they presented a grand appearance. Over one hundred pans of Calanthes, called by Mrs. Whitin the "Christmas Orchid," averaging more than five spikes to a pan, were a most gorgeous sight. Dendrobiums, Cypripediums, etc., were interspersed, making a sight not often seen in this country, and which when seen is not soon forgotten. The hospitality of Mr. and Mrs. Whitin and family was profuse, and the visit will be long remembered by a large number of invited guests as one of the most delightful of the year.

We are very much pleased to give in Mr. McWilliam's own words his method of growing Calanthes, as follows:

Whitinsville, Dec. 30, 1898.

Mr. Norton, *Chairman of Garden Committee:*

Dear Sir: In reply to your request as to how we grow Calan-

thes I would say that those grown here are all deciduous varieties, as they are the best for cut flowers. They are grown in a low narrow house, and kept near the glass. The glass is kept lightly shaded, and in summer a roller blind is used over the shaded glass. They are grown in both pots and seed-pans, and they require good drainage. The soil used is turfy loam with the fine part shaken out, a little fine bone, dried cow manure or leaf soil, and sand being added. When first potted a little water is given until they are well rooted, when they receive water liberally, and a little liquid manure when the bulbs are swelling, withholding the manure water when they commence to flower, but giving clean water as long as the leaves are green. When the flowers are cut the plants are placed beneath a stage where there are no hot pipes, and the temperature is kept at nearly sixty degrees all the time. When growth commences the bulbs are shaken out, the old roots cut off, and the bulbs placed on sand and put up to the light until the new roots appear, when they are potted. To grow Calanthes well requires a warm house — not under sixty at night, but seventy is better.

I herewith hand you a list of the varieties of Calanthes grown here, for your report:

C. Veitchii, one plant, to compare with *superba*.

" " improved, one plant.

" " *superba*, many.

" " *compacta*, of which I am getting a good stock. The bulbs and flower spikes of this one are much shorter than those of the others; but there are equally as many flowers and as large, which makes them much closer on the spike. The flower is of a soft, pleasing color, but of course you saw them when here.

C. Sandhurstiana, of the same parentage.

C. Veitchii — quite distinct; it comes into flower a little later and is much deeper in color.

C. vestita luteo-oculata.

" " *rubro-oculata.*

" " *oculata gigantea.*

C. Regnieri, two varieties.

These last two varieties come into flower about the time the others are generally past.

Yours truly,

GEO. MCWILLIAM.

WILLIAM NICHOLSON & SON'S CARNATION HOUSES, FRAMINGHAM.

We were called on December 21 to visit the commercial greenhouses of William Nicholson & Son, at Framingham, to view their carnation houses. This firm is reaping the benefit of skilful and thorough methods of growing anything they undertake. There is no haphazard way of doing things here, but the careful experience of a good many years is applied, which produces success every time. It is a pleasure to see knowledge applied to horticulture, as it is practised on this place, for the result is always successful, and the purchasers of the product are always satisfied. The carnations were pictures of robust health, and very profusely bloomed.

SUMNER AND FRANK E. COOLIDGE'S GREENHOUSES, MOUNT AUBURN.

December 22 we visited a range of large greenhouses, belonging to Sumner and Frank E. Coolidge, at Mount Auburn. They were filled with violets, lettuce, etc. The violets had in the early fall been attacked with fungus, but when we saw them they appeared to be recovering, and would, later on, produce an abundant crop. The lettuce house contained sixteen thousand five hundred heads, in very fine condition, giving promise of a good result, as the plants were in nearly marketable sizes.

The prizes awarded this year are as follows:

H. H. Hunnewell Triennial Premiums.

For an estate of not less than three acres, which shall be laid out with the most taste, planted most judiciously, and kept in the best order for three consecutive years:

First, Mrs. David Nevins	$160 00

Special Prize from the John A. Lowell Fund.

For the best house of Chrysanthemums, arranged for effect, with other plants, in pots:

First, Jason S. Bailey	50 00
Second, Mrs. B. P. Cheney	30 00

Society's Prizes.

For the best house or houses of Chrysanthemums grown on benches:

First, Edmund M. Wood & Co.	40 00
Second, Mrs. David Nevins	30 00

For the best house of Foreign Grapes:	
First, George Marston Whitin	30 00
For the best house or frames of Violets:	
First, Mrs. David Nevins	30 00
For the best Carnation house:	
First, William Nicholson	30 00
For the best Vegetable Garden:	
First, Col. Frederick Mason	40 00
Second, George D. Moore	30 00
For the best house of Forced Vegetables:	
First, George D. Moore	40 00
Second, Sumner Coolidge	30 00
For the best house of Roses:	
First, E. M. Wood & Co.	40 00

Gratuities.

Jason S. Bailey, for Greenhouses and Grounds	25 00
E. S. Converse, " " " "	25 00
E. N. Peirce & Co., for Chrysanthemums	25 00
George Marston Whitin, for Orchid House	35 00
Samuel Hartwell, for Orchards	25 00
Warren D. Hinds, " "	25 00

Respectfully submitted,

PATRICK NORTON,
AZELL C. BOWDITCH,
J. WOODWARD MANNING,
E. W. WOOD,
CHARLES N. BRACKETT,
JOSEPH H. WOODFORD,
HENRY W. WILSON,
JACKSON DAWSON,

Committee on Gardens.

REPORT

OF THE

Committee on School Gardens and Children's Herbariums

FOR THE YEAR 1898.

By HENRY LINCOLN CLAPP, CHAIRMAN.

GEORGE PUTNAM SCHOOL GARDEN, ROXBURY.

The space used for a garden, 72 × 48 feet, is now so crowded with plants, mostly perennials, that additions have been nearly stopped for lack of room. Most of the one hundred and fifty species introduced have grown vigorously, and many must be thrown away, as usual, in the spring when the garden is put in order.

The pupils of the school have made much of sketching plants in various stages of growth in the garden. Beginning with the early spring flowers, they indicated in notebooks the interesting developments of leaf and flower buds, visiting the garden at intervals of two or three days, in fair weather, until the close of school in June.

The ferns have been studied by pupils of the ninth grade, as usual, ten species having been carefully observed during the three autumn months. Five more species, together with all the more interesting crosiers, will be studied in the spring.

Many pupils of the ninth grade have made fern gardens at home. One of these pupils, Cora L. Tiley, at the last exhibition took the

first premium for fifteen finely mounted specimens of ferns, and Clara M. Hathaway, a pupil of last year's class, was awarded a gratuity for eighteen excellent additions of ferns.

All pupils of the seventh grade have made a study of the composite flowers growing in the garden.

Among the eleven species of iris is *Iris Pseudacorus*, the beautiful yellow species of the English marshes. When it began to blossom last June each flower had the regular three falls and three standards. About ten days later every flower was found to have four falls and four standards. My attention was called to the phenomenon by Miss Huston of this Committee.

Next June it will be watched with much curiosity to see if the singular metamorphosis is repeated.

COMPOSITE FLOWERS. GEORGE PUTNAM SCHOOL GARDEN.

CHILDREN SKETCHING. GEORGE PUTNAM SCHOOL GARDEN.

CURTIS SCHOOL GARDEN, MEDFORD.

DEAR MR. DAVENPORT: In compliance with your request, I send you a partial report of our school-garden work this season. I fear I cannot give you a complete list of the plants added, as, not knowing you would wish for it, I have not kept one. We have, however, added quite a number of wild flowers, as in all our visits to the woods we try to bring some roots which we had not before. Among those added the past summer have been hepatica, two new varieties of violets, early milkweed, herb Robert, rhodora, *Polygala polygama*, tall buttercup, butterfly weed (from Martha's Vineyard), and knapweed. One or two of these were to replace others which were planted last year and failed to appear this spring; but most of them were additional to the list which I sent you last year. In the line of trees we have added a cut-leaved birch, a tulip tree, a walnut (donated by the janitor), a native maple, and a native horse-chestnut. The last two were objects of much interest, as the maple was brought from the woods by one of the children, and the horse-chestnut was

IRIS VERSICOLOR. GEORGE PUTNAM SCHOOL GARDEN.

found and dug up carefully (sprouted, nut and all, complete) by a little boy in the first grade. It gave a valuable lesson on germination and was looked at with added interest, coming as it did just after our lessons on germination illustrated by the bean, pea, etc.

The garden has been a great source of pleasure as well as instruction throughout the year. We have been able to use the material there in many of our nature and drawing lessons. From the early spring, when the children hailed with delight the first appearance of the bloodroot and the tiny coils of the maiden-hair, hardly a day has passed that some one has not come at recess or before school to tell me of some new development in "our garden," as they love to call it. *There*, it seems to me, is the great value of a school garden, in a locality like ours, at least. The children can watch the daily growth and development of the plant and appreciate its wonders so much more fully than by just picking a bunch of blossoms when out for a walk.

While trying all the time to add to our wild-flower collection, we have also devoted several beds to garden flowers. We had several new beds dug last fall ready for seeds in the spring. The planting was done by the children, as far as possible, and always with some class observing. The weeding (except during vacation, of course) was done by them, and I think you will agree with me that they did very nicely for such young children. They found the gathering of the seeds an interesting part of their October nature work, and so have had an excellent opportunity for observing the complete cycle of plant life from seed to seed again. We also planted cannas, dahlias, and gladioli, and these were used in the November lessons on bulbs, tubers, etc. In connection with the lessons on bulbs we planted a number for spring blooming.

The children have tried to keep the yard, as well as the garden, in a neat and orderly condition, and we have received many compliments upon their appearance. Nothing was disturbed through the long vacation, which, considering all things, is an indication of the influence of the garden upon those who pass it daily. At least, that is the way it seems to me.

We were greatly encouraged last year by the approval given us by your Committee and enabled thereby to do quite a little which we could not otherwise have done. Should the Committee see fit to aid us this year, it will be most gratefully appreciated, and, after consultation with you, used where it would seem to bring the best result.

Respectfully submitted,

AMY WHITMORE JONES,

Principal Curtis School.

To MR. G. E. DAVENPORT.

SWAN SCHOOL GARDEN, MEDFORD.

DEAR MR. DAVENPORT: As requested, I send you a report of our school garden, and the use which the teachers and children have made of it during the year 1898.

As you know, our garden contains a large number of wild flowers, — which number we are always endeavoring to increase, — a large variety of ferns, and some trees and shrubs. We have also set apart one bed for garden flowers, such as geraniums, dahlias, etc., and another bed in which the children may plant seeds, and so observe from time to time the germination and growth of plants.

Our wild flowers are a great help to us in our nature study, and as the years roll by, and our garden develops more and more, it will become invaluable to the teachers and pupils.

We have, in our nature study, besides our talks with the children, directed most of our energy to the drawing and painting of the plants and flowers, feeling that the children in this way must make a thorough study of the growth of the same.

The care of the garden, except during the vacations, has devolved upon the children. The interest which they have shown in this, and the great care and knowledge exhibited in their weeding and caring for the beds, have certainly been encouraging.

We thank you for the interest which your Committee have shown us in the past, and trust we may merit the same in the future.

Respectfully submitted,

ROSE ATKINSON PLUNKETT.

BLOODROOT. GEORGE PUTNAM SCHOOL GARDEN.

SCHOOL GARDEN IN BATH, MAINE.

In 1896 a school garden was established in Bath, Me., by Miss Viola G. Hogan, one of the assistants in the High School. The janitor dug the ground and has occasionally furnished help when needed; but Miss Hogan, with the assistance of some of the pupils, has done all the work of stocking the garden and taking care of the plants. She has also borne the only expense thus far incurred, that of buying tags for labelling.

The garden now contains the following native flowering plants and ferns:

Antennaria plantaginifolia,
Aquilegia Canadensis,
Arisæma triphyllum,
Aster acuminatus,
" *cordifolius*,
" *diffusus*,
" *linariifolius*,
" *longifolius*,
" *macrophyllus*,
" *multiflorus*,
" *paniculatus*,
" *umbellatus*,
" *vimineus*,
Chimaphila umbellata,
Clintonia borealis,
Cypripedium acaule,
Dalibarda repens,
Gaultheria procumbens,
Geum rivale,
Hepatica triloba,
Houstonia cærulea,
Iris versicolor,
Linnæa borealis,
Medeola Virginiana,
Myosotis laxa,
Oakesia sessilifolia,
Polygonatum biflorum,
Pyrola rotundifolia,
Sarracenia purpurea,
Saxifraga Virginiensis,
Smilacina racemosa,
Solidago arguta,
" *bicolor*,
" *Canadensis*,
" *juncea*,
" *lanceolata*,
" *latifolia*,
" *nemoralis*,
" *puberula*,
" *rugosa*,
" *sempervirens*,
" *squarrosa*,
Streptopus roseus,
Symplocarpus fœtidus,
Trientalis Americana,
Viola blanda,
" *cucullata*,
" *rotundifolia*,
" *sagittata*.

FERNS.

Aspidium acrostichoides,
" *cristatum*,
" *marginale*,
" *Noveboracense*,
" *spinulosum*,
" " var. *intermedium*,
" *Thelypteris*.
Asplenium ebeneum,
" *Filix-fœmina*.
Botrychium ternatum,
Dicksonia pilosiuscula,
Onoclea sensibilis,
Osmunda cinnamomea,
" *Claytoniana*,
" *regalis*,
Phegopteris Dryopteris,
" *polypodioides*,
Polypodium vulgare.

Some plants have died, as they depend wholly on the atmosphere for moisture during the summer vacation, but these have easily been replaced.

Many of the pupils show great interest in observing the growth of the plants and in learning to distinguish the various species; and several have already made wild gardens of their own. The botany class, also, makes use of the flowers.

The establishment of this garden has been purely a labor of love, as Miss Hogan does not teach botany, that department being in charge of another teacher; and it presents a striking example of what one interested teacher can do, without asking for an appropriation of money or waiting to see if somebody else will give a large number of plants to begin with.

Why cannot other school gardens be started in the same spirit? It is the garden begun with a few plants and a great amount of interest on the part of the teacher which is destined to increase and flourish, and to inspire boys and girls with a genuine love for this delightful work.

CHILDREN'S GARDENS IN DAYTON, OHIO.

In Dayton, O., the National Cash Register Company has made a very successful attempt to improve the homes of residents of a district called South Park. Attention is given to the condition of the roadways, gutters, curbs, sidewalks, fences, trees, grass-plots, dooryards, back yards, shrubbery, etc. The sum of two hundred dollars is offered in prizes, including

"I. PRIZES TO BOYS.

"Fifty dollars in gold for the best five vegetable gardens, to be divided as follows: $15, $12, $10, $8, and $5.

BOYS' GARDEN, SOUTH PARK, DAYTON, O.

"Open to not more than forty boys (ranging in age from 8 to 15 years, inclusive) residing in South Park and selected by the Mothers' Guild.

"The N. C. R. Company provided and ploughed the ground, furnished the seeds, and permitted the use of tools for the cultivation of the plats.

"II. Prizes to Boys and Girls.

"Fifty dollars in gold (same as in the preceding) for the best-kept five back yards — whether planted with flowers, vines, shrubbery, or grass, or devoted to vegetable garden.

"Open to all boys and girls in South Park."

"The Boys' Gardens.

"The Committee on Boys' Gardens referred to the interest which the experiment had attracted, not only in South Park, but throughout the city, and mentioned the fact that hundreds of people from all parts of the city had visited the gardens during the summer. This Committee gave frequent inspections during the growing season to the work done, and congratulated the boys very heartily upon their perseverance and the intelligence shown in the cultivation of the ground allotted them. The quantity of vegetables raised in these gardens, the Committee says, will compare favorably with the results attained by persons of more mature years and experience. The Committee also expressed gratification at

A FIRST-PRIZE WINNER, DAYTON, O.

the evidence in improvement in skill and judgment apparent in the work of the young gardeners as the months passed by."

This commendable work appears to have been started by Mr. J. H. Patterson, the president of the N. C. R. Company. Rev. Mr. Sinclair, in speaking of the enterprise, said, "We are getting to see that religion is not simply singing hymns and praying, but it is, as well, right living, with pleasant homes and clean yards. The only regret that I have is that the people throughout the city cannot see this audience and witness this scene. These views (of gardens and yards on exhibition in the chapel) ought to be on exhibition in every corner, and wake up the entire city.

"Mr. Patterson has his reward for this work. He may not

PRIZE FRONT YARD, DAYTON, O.

PRIZE BACK YARD, DAYTON, O.

get it in dollars and cents, but in satisfaction for good deeds, for he has learned that the only thing worth living for is the kindly feeling for our fellow-men."

With a similar feeling the Massachusetts Horticultural Society and the Committee on School Gardens and Children's Herbariums have undertaken a similar work and carried it to a successful result. Dayton and Boston have a bond of sympathy.

TRENTON PUBLIC SCHOOLS.

SECOND SEASON OF SCHOOL GARDEN FOR SCHOOL NO. 15.

DECEMBER 16, 1898.

MR. HENRY L. CLAPP:

DEAR SIR: In answer to your letter of the 12th: We begin our planting of seeds in our schoolrooms, the children watching the development of such plants as corn, beans, peas, etc.; then, as the spring advances, the seeds and plants are placed in the outdoor gardens by the children, they doing all the work and being very much interested in it.

We plant hardy plants for the summer months, with dahlias and chrysanthemums for fall blooming.

Our idea in starting the gardens in the first place was simply to try to cultivate a love for the beautiful in those living in the vicinity of the school, and by this means to raise the moral tone of the neighborhood.

The children, guided by the teachers, take entire care of the beds.

We find it very helpful in giving science lessons in the primary grades, besides the gain from an ethical standpoint, so that they have been worth all the time and thought given to them.

I am

Yours very truly,

ELIZABETH HUGHES.

A GERMAN SCHOOL GARDEN.

Dr. Herman T. Lukens, formerly professor in Clark University, last spring visited the George Putnam School Garden, and during the summer vacation went to Germany to observe methods of

GERMAN SCHOOL GARDEN.

education there. In his "Notes Abroad," thoughtfully sent to your chairman, is found this interesting paragraph:

"Dr. O. W. Beyer took his class up the Saale valley to Pössneck to examine one of the best organized school gardens in Germany. There, on a plot of ground prepared in 1895 at a cost of $750 and requiring an annual outlay of only $75, six hundred pupils have each his or her separate garden patch, and every day between five and six P.M. they come to weed, water, hoe, train, or otherwise attend to, and reap, what they have sown. The central path in the garden is reserved for the parents, who come there to promenade and enjoy the sight as well as to encourage their children and help them carry off the armloads of cabbages, potatoes, lettuce, onions, turnips, and flowers for home consumption.

CHILDREN'S HERBARIUMS.

An extraordinary number of herbarium specimens were sent for the exhibition Nov. 25 and 26, 1898. There was not sufficient space in both halls for displaying all the plants. From one thousand three hundred and sixty-six sheets last year the number rose to two thousand two hundred and fifty-two this year, and that, too, without any special effort being made by the Committee. Such a result shows that the work has come to stay.

It has taken years of work to spread abroad the information necessary to insure a natural and permanent growth; yet at the eleventh hour new exhibitors appear every year, declaring that they have just heard of the exhibition.

If the herbariums continue to increase in number and size, which seems certain, it will be necessary in future to exhibit only the most meritorious collections, and, therefore, those who intend to exhibit will need to consider the quality of their work especially — fine specimens, artistic mounting, careful naming, neat writing, and the name of the town where the specimen was found should be added.

Vanessa Denton's one hundred and twenty-seven additions of flowering plants, considering the number of specimens and the quality of the mounting, was the most remarkable. "No ordinary collector or professor of botany would mount specimens as beautifully as those are mounted; he couldn't spend the time," a botanist was heard to say. "Well," said another, "she says she is going to be a professor of botany one of these days, and she is only twelve now. This is the second time she has exhibited, but she has never seen an exhibition of this kind here because she was in Europe, or on her way there, with her father, who has become so famous for his collections of butterflies. She is a born naturalist."

Rachel P. Snow, eleven years old, will have an interesting experience to look back upon when she is twenty. She exhibited this year for the first time and took the second prize for one hundred specimens. She began to study plants and then interested her parents to work with her. Her father bought a nice microscope, and her mother a botany. Then the mother took private lessons in botany, and all three worked together in a delightful manner, and all attended the exhibition and manifested in a quiet, studious way much discrimination on fine points, such as are found in the more difficult species of violets, pyrolas, etc.

The largest number of specimens sent by one collector was three hundred and forty-two additions of flowering plants. During the flowering seasons of 1896, '97, and '98 George E. Nichols must have had very busy, interesting, and instructive times in order to send so many complete and well-mounted specimens in addition to one hundred different specimens sent in 1895. By this time he has learned what a rare plant is.

The youngest exhibitor was Charles Withington, seven years old. Without knowing anything about our exhibitions or receiving any stimulus from them he collected and mounted one hundred and thirty-five plants on thirteen sheets. Of course the mounting and writing were hardly up to exhibition standards, but his natural interest was remarkable, and that put him in the right attitude to learn quickly from the exhibits. Besides the collections already mentioned, especially fine ones were sent by Maude Clark and Melora Warner, of the Manchester High School, Genevieve Doran and Rachel P. Snow, of Watertown, and Olive L. French and Bessie R. Parmenter, of South Sudbury.

Arthur E. French, of South Sudbury, sent some very rare plants — two sedges, four grasses, and sixteen flowering plants. Having exhibited every year since 1893, the plants unknown to him in his locality are rare indeed. And he is a rare boy.

Phillips Barry, Arthur C. Faxon, George E. Nichols, Marion C. Goward, and Lulu D. Ellis have shown the same natural love for plants, and the same persistency in hunting them out. It is very gratifying to your Committee to have seen children pursuing such work with unabated interest for four or five years, until they had thoroughly searched their own neighborhood for plants, or had reached the maximum age prescribed for exhibitors. This is the way genuine botanists are made. Apparently no other expenditure or work of this Society yields larger returns. From this seed-planting we may reasonably expect much fine fruit within a generation.

The Houghton High School, of Bolton, sent a fine school collection. Six girls belonging to the school exhibited individual collections. However, the whole work seems to have been started by one interested teacher, who did not wait until she had acquired a mass of botanical knowledge herself for fear of making a mistake in teaching or naming plants, but started right in to work and learn with the children. The spirit is superior to cut-and-dried methods; it will find a method for itself. The old notion among

teachers of infallibility, of not making a mistake, is even now preventing children from getting a love for plants as beautiful, growing things. And this Society is doing excellent work in breaking up that ancient notion, by sending children directly to plants, whether accompanied by teachers or not, and by encouraging both pupils and teachers to help themselves.

Our friends, the reporters for the principal Boston newspapers, promptly appeared when the exhibition opened, and each gave several generous and appreciative notices, which undoubtedly contributed much to the satisfactory attendance of visitors, fifty at a time being counted.

For the Committee,

HENRY L. CLAPP,
Chairman.

PRIZES AND GRATUITIES AWARDED FOR SCHOOL GARDENS AND CHILDREN'S HERBARIUMS.

SCHOOL GARDENS.

George Putnam School, Roxbury, first prize	$15 00
Curtis School, Medford, second prize	12 00
Swan School, Medford, third prize	10 00
High School, Bath, Me., gratuity	8 00

CHILDREN'S HERBARIUMS.

FLOWERING PLANTS. — For one hundred and twenty-five specimens:	
First prize, Melora Warner	5 00
For one hundred specimens:	
First prize, Maude Clark	4 00
Second, Rachel P. Snow	3 00
For seventy-five specimens:	
First prize, Bessie R. Parmenter	3 00
Second, Ella S. Waite	2 00
For fifty specimens:	
First prize, Edith Newton	2 00
For twenty-five specimens:	
First prize, Cora L. Mentzer	1 50
Second, Zipporah Sawyer	1 00
For ten specimens:	
First prize, Gonnard Landberg	75
Second, James Steele	50
Gratuities:	
George E. Nichols, for three hundred and forty-two additions	7 00
Vanessa Denton, for one hundred and twenty-seven "	5 00
Genevieve Doran, for one hundred and twenty-five "	4 00
Marion C. Goward, for one hundred and twenty-five "	3 50

Florence A. Grey, for one hundred and twenty-five specimens	3 00
Ethel Nixon, for one hundred and twenty-one specimens	2 75
Bessie A. Eckert, for seventy-five specimens	1 50
Olive L. French, for seventy-five additions	3 00
Marion Withington, for fifty specimens	1 25
Cora A. Jacobs, for thirty-three specimens	75
Arthur E. French, for sixteen additions	2 50
Charles Withington, for thirteen sheets	1 00
John D. Fallon, for ten specimens	50
Leonard A. Page, for ten "	50
Ferns. — For twenty-five specimens:	
First prize, Amelia Etzensperger	4 00
Second, Marion C. Goward	3 50
For fifteen specimens:	
First prize, Cora L. Tiley	3 00
For five specimens:	
First prize, Melora Warner	75
Gratuities:	
Clara M. Hathaway, for eighteen additions	3 50
Arthur E. French, for four additions of grasses	1 00
Arthur E. French, for two additions of sedges	1 00

SCHOOL HERBARIUMS.

Houghton High School, Bolton, first prize for four classes — flowering plants two hundred and thirty-eight, ferns nine, leaf sprays nineteen, grasses five	4 00
Total for Herbariums and Gardens	$124 75

The amount of money appropriated by the Society for the use of this Committee was		$250 00
Awarded for School Gardens	$45 00	
Awarded for Herbariums	79 75	
Kilburn & Cross (cut)	5 00	
Printing	25 75	
Advertising	18 20	
Expressage, postage, stamping, etc.	9 80	
	———	183 50
Balance unexpended		$66 50

Henry L. Clapp, Roxbury,
Mrs. H. L. T. Wolcott, Dedham,
George E. Davenport, Medford,
Miss Katharine W. Huston, Roxbury,
Mrs. P. D. Richards, West Medford,
William P. Rich, Chelsea,
W. E. C. Rich, *Secretary*,
99 Moreland st., Roxbury, Mass.,

Committee on School Gardens and Children's Herbariums.

REPORT

OF THE

COMMITTEE OF ARRANGEMENTS

FOR THE YEAR 1898.

By JOSEPH H. WOODFORD, CHAIRMAN.

The year just about closing has been one of unusual importance to our Society, and the exhibitions, numbering twenty-three in all, have been attended by great multitudes of people.

The halls have been arranged in such a manner as best to accommodate the increased number of exhibitors. At some of our shows (notably the chrysanthemum exhibition) the lower hall was very much overcrowded with magnificent flowers, yet when the exhibition was opened to the public at twelve o'clock, noon, it presented a grand appearance; for here was displayed the finest collection of chrysanthemum flowers ever exhibited in this country.

The hall was arranged with the greatest extent of table room possible, and in the best possible manner consistent with the limited space at the disposal of your Committee.

It is a pity that we have not a fine hall on the ground floor, of sufficient capacity to contain, without crowding, all the exhibits, and, in addition, sufficient space for the comfort of exhibitors and the public.

No one feels more the want of more expanded quarters than does your Committee, for it is at times very embarrassing to find room for exhibits in such limited quarters as are now at their disposal.

We would again call attention to our Report for the year 1895, in which we allude to the poor accommodations we then had for our exhibitions, and we are sorry to say they still exist, and at present we see no immediate prospect of relief.

We are under renewed obligations to the press for the copious reports of our exhibitions which they have so faithfully published; and we are also glad to report enthusiastic competition by new members of our Society, thereby filling up any vacancies occasioned by the dropping out of some of the older exhibitors.

The amount of money placed to the credit of your Committee for extraordinary expenses has been expended judiciously, and for the best interests of our Society.

The receipts for admission to the two shows at which fees were exacted will appear at the end of this report, and we fully believe they would have been very much greater had we had at our disposal better accommodations for the comfort of our patrons.

From the Treasurer's books we take the following:

Receipts at Spring Exhibition	$294 00
Receipts at Chrysanthemum Exhibition . . .	568 50
	$862 50

all of which is in the Treasury of the Society.

Respectfully submitted,
For the Committee,
Jos. H. Woodford,
Chairman.

REPORT

TO THE

STATE BOARD OF AGRICULTURE

FOR THE YEAR 1898.

The Massachusetts Horticultural Society began its year of 1898 with a series of lectures which continued through March. A full report of them is made in Part I. of the TRANSACTIONS of the Society for this year.

January 8. "The Business Side of Fruit Culture," by Mr. J. H. Hale, South Glastonbury, Conn.

January 15. "Horticulture in Holland: Decoration in Public Parks, Bulb Growing, Nursery Stock at Boskoop." (With stereopticon illustrations.) By Mr. John K. M. L. Farquhar, Boston, Mass.

January 22. "Originating New Vegetables," by Hon. Aaron Low, Hingham, Mass.

January 29. "Nuts and Nut Culture," by Mr. Frank M. Bartram, Parry, N.J.

February 12. "Some New Notions about Some Old Insects," by Prof. M. V. Slingerland, Cornell University, Ithaca, N.Y.

February 19. "Trees in Streets and Elsewhere," by Mr. W. R. Smith, Superintendent Botanic Garden, Washington, D.C.

February 26. "The National Flower Movement," by Mr. Frederick Leroy Sargent, President Columbine Association, Cambridge, Mass.

March 12. "The Relation of Our Public Schools to Rural and Urban Life, and the Value of Nature Studies in Our System of Public Instruction," by Mr. George T. Powell, Ghent, N.Y.

March 19. "The Resistance of Plants to Parasitic Fungi," by Prof. E. A. Burt, Middlebury College, Middlebury, Vt.

March 26. "Native Ferns of New England." (Illustrated by numerous lantern slides.) By Mr. Henry Lincoln Clapp, George Putnam School, Boston, Mass.

April 21. "Wild Flowers of the Canadian Rockies," by Mr. Cornelius Van Brunt.

The Spring Exhibition was opened March 22, and continued through the 25th.

The Rhododendron Show was held June 7 and 8.

The Rose and Strawberry Exhibition was held June 23 and 24.

The Annual Exhibition of Plants and Flowers was held August 31 and September 1.

The Annual Exhibition of Fruits and Vegetables was held September 29 and 30.

The Chrysanthemum Exhibition was held for four days, beginning November 8.

There were also held prize exhibitions on Saturdays from 12 M. to 3 P.M., April 2, May 7, May 21, June 11, September 10, September 17, November 5, and every Saturday from July 2 to August 20, inclusive.

The Society offered $8,100 in prizes.

All of the exhibits were fully above the high standard of excellence maintained by the Society and showed a very marked improvement in the gardeners' skill.

Respectfully submitted,

N. I. Bowditch,

Inspector.

REPORT

OF THE

COMMITTEE ON THE LIBRARY

FOR THE YEAR 1898.

The Committee on the Library makes its customary report that its appropriations have been expended in the usual way and the List of Accessions to the Library for the year will show that the increase of the Library by gift and purchase has been very nearly the same as for several years past.

It is well known that the Stickney Fund passes out of our possession at the end of this year, but it becomes us rather to rejoice that we have had it so long than to repine that it is not ours permanently; for, mainly owing to the income we have received from it in these thirty years, this Library has grown from the condition of a humble collection of commonplace books to a place in the very front rank of special libraries. In default of this fund the Committee will ask for an appropriation sufficient to keep the Library moving in the path of progress and improvement.

The crowded condition of our bookcases may cause some to question the wisdom of continuing our purchases before some additional storage room can be provided, but there are many works which must be had soon, if at all. Learned societies and large public libraries are fast gathering in the very few remaining copies of some of these, and the price of those which are left must, of course, advance rapidly. Some of our costliest books could not now be purchased for three times what we gave for them, and duplicates of many of them cannot now be had at any price.

Moreover, as the income of the Stickney Fund was restricted by the donor to the purchase of books, we have not been able to do as much in the way of binding as the needs of the Library demanded.

If these matters be fully understood we have no doubt that the Society will act in that liberal manner which has distinguished it whenever the Library has made requests in the past.

For the Committee,

W. E. Endicott,

Chairman.

REPORT

OF THE

SECRETARY AND LIBRARIAN.

The publication of Part II. of the TRANSACTIONS for 1897 was much delayed by the failure of the Chairman of one of the awarding committees to make his report, and after delay caused by unfulfilled promises to bring it in, the Committee on Publication were obliged to order that this part of the Transactions be printed without the report in question. Part I. for 1898 was delayed, as last year, by the failure of one of the lecturers to return his lecture, which he had taken home for revision. This failure was caused by an accident which totally unfitted him for any work, and at the last accounts he feared that he had promised what he could not perform. The Committee have therefore directed that in the absence of this lecture the abstract prepared for the "Transcript" be printed in its place. But for these unfortunate occurrences the Transactions above mentioned would have been printed some months earlier than they will now be. Part I. for 1898 is, however, now in type, and will speedily be published. There still remain the third parts for 1896 and 1897, consisting of the List of Library Accessions for those years, but the former is now nearly ready for the printer. The great labor of preparing these lists has prevented an earlier performance of it. The Schedule of Prizes for 1898 was ready before the end of the preceding year, and that for 1899 is now nearly ready to be printed. At the request of the Committee on Establishing Prizes a statement of all the changes made in the Schedule for 1898 to adapt it to the next year has been prepared and printed.

The most notable event in the history of the Library during the present year is the expiration of the interest of the Society in the Stickney Fund. During the thirty years that the Society has enjoyed the benefit of this fund, the income, amounting in all to

$21,000, has been most carefully devoted to the purpose for which it was designed by the donor, and the result is such a collection of books as forms a noble monument to his memory. The names of all these books have been published from year to year, and the most important have been specially mentioned, and the members of this Society should not now need to have the names of even the most noteworthy recalled. If there are any who are not aware of the importance and value of these books — which will increase from year to year — we trust that they will visit this room and learn to appreciate it. But it must not be assumed that Mr. Stickney's gift has left no more to be acquired of books published in the past; and research in botany, horticulture, and kindred sciences was never more active than now, and we may expect that in the future many books will be published which should on no account fail to find a place in our Library. Indeed, among those already published, several classes of books that we have not already acquired might be named of which this would be true, and we cannot doubt that the Society will make an appropriation sufficient for the purchase of such books. In the present crowded state of our bookcases it may be expedient not to purchase so many books as we should if we had ample room, but to devote more time and money to the binding of those which are in need, such as the publications of the United States Department of Agriculture and the Experiment Station Bulletins, of both of which our collection is probably among the most complete in existence. And in the good time, which no one who has faith in the Society doubts is coming, when all its departments shall be provided with ample room, not only for that day, but for further growth, we trust that the Society will meet its claims with an appropriation sufficient to keep up the well-deserved reputation of the Library.

The problem how to increase the usefulness of the Library has been kept constantly in view. Perhaps this end may be better attained by indirect than by direct methods. It will be of little avail to entreat or urge men to come and use books on subjects in which they feel no interest, but the Society is constantly engaged in the work of educating the community in a taste for horticulture, and we cannot doubt that with the growth of this taste the use of the Library will increase. If any one had been asked four years ago what department of the Library was most likely to spring into prominence and usefulness, perhaps the last

that he would have thought of would have been that of Mycology and other branches of Cryptogamic Botany, and yet within that time we have seen such a growth of interest in that very department. And to draw an illustration from that field — I should not be surprised if hidden agencies were now at work which may lead to equal interest in some other department of the Library, or even in the whole subject of botany and horticulture, as the obscure growth of mycelium suddenly makes itself visible in wholesome and delicious mushrooms. It may be doubted whether any library accomplishes all the good that it may be imagined capable of effecting, but we cannot think that the magnificent works purchased by Mr. Stickney's gift, the thought given to their selection, the thousands of books received from other sources, the care and pains taken to perfect copies and sets, and to catalogue and index them, so that they shall rise from the position of a mere collection of books to the dignity of a library, are destined to come to naught, or to fail of ultimate appreciation.

The Card Catalogues of Plates, of Books, and of Subjects treated in the Reports of Experiment Stations throughout the country have been kept constantly in mind, and as much time as could be given, consistently with duty to other departments, has been bestowed upon them. The last mentioned, which is prepared at the Office of Experiment Stations, in the United States Department of Agriculture, although much less extensive than either of the other two, now contains 17,000 cards.

Among the more important books added to the Library during the year may be mentioned Beccari's "Malesia," in three volumes; Lowe's "Yew Trees of Great Britain and Ireland;" Step's "Favourite Flowers of Garden and Greenhouse," in four volumes; Hogg and Johnson's "Wild Flowers of Great Britain," in eleven volumes; a supplementary volume to the last edition of Sowerby's English Botany; Watt's "Dictionary of the Economic Products of India," six volumes in ten; Duthie's "Field and Garden Crops of India," in three parts; a large folio book of Chinese drawings illustrating the Growth and Progress of the Tea Plant; Field's "Ferns of New Zealand;" and the "Pomologie de la France," a work published by the coöperation of French horticultural and agricultural societies, six volumes in three.

An unusually large number of books on Entomology have been purchased, including Buckton's "Monograph of British Aphides,"

in four volumes; Cameron's "Monograph of the British Phytophagous Hymenoptera," in four volumes; Humphreys and Westwood's "British Moths," in two volumes; the "British Butterflies" of the same authors; Holland's "Butterfly Book;" and Douglas and Scott's British "Hemiptera Heteroptera," all illustrated with many plates, which, except in the last mentioned, are colored. This, however, is so important a work that the Assistant Entomologist of the Gypsy Moth Commission made two journeys to Amherst to consult it, but now he can find it without going so far. The enthusiasts in the study of Fungi have been remembered by the purchase of Richon and Roze's "Champignons Comestibles et Vénéneux de la France," and Rabenhorst's "Kryptogamen Flora," the latter not yet completed, but already numbering five volumes in eleven parts. We have long possessed the Second Series of "The Phytologist," and now have been so fortunate as to secure the First Series — a much more difficult achievement than to obtain a second series to add to a first.

ROBERT MANNING,
Secretary and Librarian.

DECEMBER 17, 1898.

TREASURER'S REPORT

FOR THE YEAR 1898.

MASSACHUSETTS HORTICULTURAL SOCIETY, *in account current with* CHARLES E. RICHARDSON, *December 31, 1898.*

DR.

To amount paid on account of Library in 1898:		
For books, periodicals, and binding . . .	$400 00	
From income of J. Stickney Fund for books .	730 74	
		$1,130 74
To amounts paid Interest on Funds for Prizes, credited opposite		1,892 72
" " " " " Notes and Bonds purchased . .		271 45
" " " on Prizes awarded in 1897, paid in 1898, as follows:		
" amounts paid for Plants	$1,938 50	
" " " " Fowers	2,526 00	
" " " " Fruits	1,592 00	
" " " " Vegetables	1,151 00	
" " " " Gardens and Greenhouses .	500 00	
" " " Hunnewell Prizes for Rhododendrons	105 00	
		7,812 50
To amounts paid Committee on School Gardens and Children's Herbariums		183 50
" " " Lake Shore & Michigan Southern R.R. Bonds	$10,415 25	
" " " City of Newton Bonds . . .	24,228 75	
" " " Atchison, Topeka & Santa Fé R.R. Bonds	44,693 25	
" " " Chicago, Burlington & Quincy R.R. Bonds	50,012 50	
		129,349 75
To amounts paid on Notes Receivable		40,000 00
" " " " Loan from National Webster Bank . .		18,000 00
" " " Salaries of Secretary, two Assistants and Treasurer		4,300 00
" " " Salaries of Committees		1,243 00
" " " City Tax		3,141 69
Amount carried forward		$207,325 35

Amount brought forward	$207,325 35
To amount paid Legal Services	4,097 41
" " " Incidentals	854 72
" " " Services on Transactions	78 00
" " " Stationery, Printing, and Postage	1,452 02
" " " Labor	2,392 95
" " " Committee of Arrangements	400 00
" " " Insurance	1,413 37
" " " Repairs	634 05
" " " Furniture and Exhibition Ware	24 15
" " " Heating	775 09
" " " Lighting	882 40
" " " Water Rates	276 20
" " " Lectures and Publication	269 55
Total payments	$220,875 26
Cash balance December 31, 1898	14,105 60
	$234,980 86

CR.

By Balance of account rendered December 31, 1897			$6,664 89
Received from Building in 1898, viz.:			
Rent of Stores	$11,266 66		
" " Halls	2,500 00		
		$13,766 66	
Received Income from Mount Auburn		3,156 21	
" State Bounty		600 00	
" Admissions and Assessments		1,010 00	
" Annual Exhibitions:			
Gross Receipts	$862 50		
Less Expenses	539 78		
		322 72	
" Interest on Bonds	$5,105 00		
" " " Town Notes	953 87		
" " " Legacy from F. B. Hayes,	1,722 12		
" " " Bank Balance	391 84		
		8,172 83	
" Copies of History		5 50	
" Notes Receivable		40,000 00	
" Sale of Transactions		1 00	
" H. H. Hunnewell, Prize money for 1897		55 00	
" A. P. Loring, Executor		15,000 00	
" Francis Brown Hayes Fund		10,000 00	
Amounts carried forward		$92,089 92	$6,664 89

Amounts brought forward			$92,089 92	$6,664 89
Received Bequest of Francis Brown Hayes .			133,333 33	
" Henry A. Gane Memorial Fund . .			1,000 00	
" Interest credited following Funds, charged opposite:				
Samuel Appleton Fund .	$50 00			
John A. Lowell " .	50 00			
Josiah Bradlee " .	50 00			
Benjamin V. French Fund .	25 00			
W. J. Walker " .	117 72			
Levi Whitcomb " .	25 00			
Benjamin B. Davis " .	25 00			
Marshall P. Wilder " .	50 00			
John Lewis Russell " .	50 00			
Theodore Lyman " .	550 00			
H. H. Hunnewell " .	200 00			
Josiah Stickney Fund, as agreed	700 00			
			1,892 72	
				228,315 97
				$234,980 86

CHARLES E. RICHARDSON,
Treasurer.

Approved:

H. H. HUNNEWELL,
A. HEMENWAY,
FRANCIS H. APPLETON,
Finance Committee.

ASSETS AND LIABILITIES OF THE MASSACHUSETTS HORTICULTURAL SOCIETY.

DECEMBER 31, 1898.

ASSETS.

Real Estate	$250,000 00	
Stereotype Plates and Copies of History	251 50	
Lake Shore & Michigan So. R.R. Bonds	10,415 25	
City of Newton Bonds	24,228 75	
Chicago, Burlington & Quincy R.R. Bonds	1,000 00	
Atchison, Topeka & Santa Fé R.R. Bonds	44,693 25	
Chicago, Burlington & Quincy R.R. Bonds	50,012 50	
Sinking Fund	23,872 50	
Kansas City, Clinton & Springfield R.R. Bonds	1,980 00	
Furniture and Exhibition Ware	7,674 90	
Library	38,111 47	
City of Boston	352 62	
Charles I. Quirk	75 00	
A. P. Loring, Executor	7,500 00	
H. E. Woodward	8,350 81	
George A. Sutherland	97 50	
Cash on hand and in Bank	14,105 60	
		$482,721 65

LIABILITIES.

Mortgage	$1,000 00	
Josiah Stickney Fund payable to Harvard College, Feb. 1, 1899	12,000 00	
Unexpended balance of Stickney Fund for Books,	1 00	
Prize Funds invested in Building:		
Samuel Appleton Fund,	$1,000 00	
John A. Lowell "	1,000 00	
Josiah Bradlee "	1,000 00	
Benjamin V. French "	500 00	
William J. Walker "	2,354 43	
Levi Whitcomb "	500 00	
Benjamin B. Davis "	500 00	
Theodore Lyman "	11,000 00	
H. H. Hunnewell "	3,000 00	
Francis Brown Hayes "	10,000 00	
Henry A. Gane Memorial "	1,000 00	
	$31,854 43	
Amounts carried forward,	$31,854 43	$13,001 00

Amounts brought forward,		$31,854 43	$13,001 00	
Invested in Bonds:				
Marshall P. Wilder Fund,	$1,000 00			
John Lewis Russell "	1,000 00			
H. H. Hunnewell "	1,000 00			
		3,000 00		
			34,854 43	
Prizes for 1898 payable in 1899			8,100 00	
				55,955 43
Surplus				426,766 22
				$482,721 65

CHAS. E. RICHARDSON,
Treasurer.

MEMBERSHIP ACCOUNT OF THE MASSACHUSETTS HORTICULTURAL SOCIETY, DECEMBER 31, 1898.

Life Members per last report	549		
Added in 1898	11		
Commuted from Annual	7		
		567	
Deceased		32	
			535
Annual Members per last report	212		
Added in 1898	18		
		230	
Commuted to Life	7		
Deceased	5		
Resigned	2		
Dropped for non-payment for two years	13		
		27	
			203
Present Membership			738

INCOME FROM MEMBERS.

11 new Life Members @ $30	$330 00
18 new Annual Members @ $10	180 00
7 Commuted to Life @ $20	140 00
Annual Assessments	360 00
	$1,010 00

CHAS. E. RICHARDSON,
Treasurer.

Dr. *Massachusetts Horticultural Society in account with the Proprietors of Mount Auburn Cemetery.* **Cr.**

For Sales and Improvements within the Cemetery for the year ending December 31, 1898.

To cost of filling up and improving land at Mount Auburn for the year ending Dec. 31, 1898, the Massachusetts Horticultural Society being charged with their proportion of the same:		
Birch to Eagle and Cherry Avenues	$64 68	
Vinca Path and Maple Avenue	55 31	
Yew and Fountain Avenues	66 75	
Glen Avenue	237 19	
	$423 93	
One-fourth of $423.93 is	$105 98	
Balance due Mass. Horticultural Society,	3,156 21	
		$3,262 19

By sales in January	$500 00
" " February	10 00
" " March	651 40
" " April	2,386 00
" " May	3,543 35
" " June	1,380 00
" " July	1,440 00
" " August	225 00
" " September	1,096 00
" " October	915 00
" " November	1,190 00
" " December	130 00
	$13,416 75
Net amount received from Receiving Tomb	1,082 00
	$14,498 75
Less graves repurchased	50 00
	$14,448 75
Deduct for Annual Expenses	1,400 00
	$13,048 75
Mass. Horticultural Society $\frac{1}{4}$ part of $13,048.75	$3,262 19

E. & O. E.

DECEMBER 31, 1898.

H. B. MACKINTOSH, *Treasurer.*

MASSACHUSETTS HORTICULTURAL SOCIETY

To the PROPRIETORS OF MOUNT AUBURN CEMETERY. *Dr.*

For one-fourth part of the following expenditures for grading new lands for sale during the year 1898:

Birch to Eagle and Cherry Avenues.

28¾ days, men		$64 68

Vinca Path and Maple Avenue.

20 days, men	$45 00	
2¾ days, man and horse	10 31	
		55 31

Yew and Fountain Avenues.

16¾ days, men	$37 69	
7¾ days, man and horse	29 06	
		66 75

Glen Avenue.

63½ days, man and horse	237 19
	$423 93
One-fourth of $423.93 is	$105 98

JAMES C. SCORGIE,

Supt. of the Cemetery of Mount Auburn.

MOUNT AUBURN, Dec. 31, 1898.

I certify the foregoing to be a true copy of improvements for the year 1898, rendered by the Superintendent.

H. B. MACKINTOSH,

Treasurer.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1899.

President.

FRANCIS H. APPLETON, of Peabody.

Vice-Presidents.

CHARLES H. B. BRECK, of Brighton.
BENJAMIN P. WARE, of Clifton.
WALTER HUNNEWELL, of Wellesley.
SAMUEL HARTWELL, of Lincoln.

Treasurer and Superintendent of the Building.

CHARLES E. RICHARDSON, of Cambridge.

Secretary and Librarian.

ROBERT MANNING, of Salem.[1]

Professor of Botany and Vegetable Physiology.

BENJAMIN M. WATSON, of Jamaica Plain.

Professor of Entomology.

SAMUEL H. SCUDDER, of Cambridge.

Delegate to the State Board of Agriculture.

E. W. WOOD, of West Newton.

[1] Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

STANDING COMMITTEES.

Executive.

THE PRESIDENT, FRANCIS H. APPLETON, CHAIRMAN.

THE CHAIRMAN OF THE FINANCE COMMITTEE, H. H. HUNNEWELL, *Ex officio*.

WILLIAM C. STRONG. BENJAMIN C. CLARK.
WILLIAM H. SPOONER. WALTER HUNNEWELL.
NATHANIEL T. KIDDER. CHARLES W. PARKER.
CHARLES F. CURTIS.

Finance.

H. HOLLIS HUNNEWELL, OF BOSTON, CHAIRMAN.

FRANCIS H. APPLETON. AUGUSTUS HEMENWAY.

Lectures and Publication.

AARON LOW, OF HINGHAM, CHAIRMAN.

JAMES H. BOWDITCH. E. W. WOOD.

Library.

WILLIAM E. ENDICOTT, OF CANTON, CHAIRMAN.

GEORGE W. HUMPHREY. GEORGE E. DAVENPORT.
WALTER S. PARKER. CHARLES W. SWAN.

Plants.

WILLIAM WALLACE LUNT, OF HINGHAM, CHAIRMAN.

JAMES WHEELER. ARTHUR H. FEWKES.
WILLIAM J. MARTIN. ROBERT CAMERON.

Flowers.

J. WOODWARD MANNING, OF READING, CHAIRMAN.

MICHAEL H. NORTON. FREDERICK S. DAVIS.
KENNETH FINLAYSON. JAMES COMLEY.

Fruits.

E. W. WOOD, OF WEST NEWTON, CHAIRMAN.

CHARLES F. CURTIS. WARREN FENNO. J. WILLARD HILL.
O. B. HADWEN. SAMUEL HARTWELL. SUMNER COOLIDGE.

Vegetables.

WARREN H. HEUSTIS, OF BELMONT, CHAIRMAN.

CEPHAS H. BRACKETT. WALTER RUSSELL. GEORGE D. MOORE.
VARNUM FROST. AARON LOW. JOSHUA C. STONE.

Forestry and Roadside Improvement.

HARVEY N. SHEPARD, CHAIRMAN.

NATHANIEL S. SHALER. J. WOODWARD MANNING.
J. D. W. FRENCH. JAMES STURGIS PRAY.

Gardens.

PATRICK NORTON, of Dorchester, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND ARRANGEMENTS, *Ex officiis.*

HENRY W. WILSON. JACKSON T. DAWSON.

For Establishing Prizes.

WILLIAM J. STEWART, of Winchester, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis.*

WILLIAM J. MARTIN.

Committee of Arrangements.

JOSEPH H. WOODFORD, of Boston, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis.*

ROBERT FARQUHAR.

MEMBERS FOR LIFE.

Members of the Society and all other persons who may know of deaths, changes in residence, or other circumstances showing that the following list is incorrect in any particular, will confer a favor by promptly communicating to the Secretary any needed corrections.

Information, or any clew to it, is especially desired in regard to members whose names are marked thus †.

Adams, Henry Saxton, Dorchester.
Adams, Luther, Newton.
Alger, Rev. R. F., Becket.
Allen, Hon. Charles H., Lowell.
Allen, Thomas, Boston.
Ames, George, Boston.
Ames, Oakes, 2d, North Easton.
Ames, Preston Adams, Boston.
Amory, Frederick, Boston.
Andrews, Charles L., Milton.
Andrews, Frank W., Washington, D.C.
Andros, Milton, San Francisco, Cal.
Appleton, Francis H., Peabody.
Appleton, William S., Boston.
Ash, John, Pomfret Centre, Conn.
Asmus, Ernst G., West Hoboken, N.J.
Atkins, Edwin F., Belmont.

Bailey, Jason S., West Roxbury.
Bancroft, John C., Boston.
Banfield, Francis L., M.D., Worcester.
Barber, J. Wesley, Newton.
Barnard, James M., Boston.
Barnard, Robert M., Everett.
Barnes, Walter S., Somerville.
† Barney, Levi C., Boston.
Barrett, Edwin S., Concord.
Barry, John Marshall, Boston.
Barry, William C., Rochester, N.Y.
Bartlett, Edmund, Newburyport.
Beal, Leander, Boston.
Becker, Frederick C., Cambridge.
Beckford, Daniel R., Jr., Jamaica Plain.
Beebe, E. Pierson, Boston.
Beebe, Franklin H., Boston.
Beebe, J. Arthur, Boston.
Berry, James, Brookline.
Blake, Edward D., Boston.
Blake, Francis, Weston.
Blake, Frederick A., Rochdale.
Blakemore, John E., Roslindale.
Blanchard, John W., Dorchester.
Blinn, Richard D., Chicago, Ill.
Bliss, William, Boston.
Boardman, Samuel M., Hyde Park.
Bôcher, Prof. Ferdinand, Cambridge.
Bockus, Charles E., Dorchester.
Bosler, Frank C., Carlisle, Penn.
Bowditch, Azell C., Somerville.
Bowditch, Charles P., Jamaica Plain.
Bowditch, Ernest W., Milton.
Bowditch, James H., Brookline.
Bowditch, Nathaniel I., Framingham.
Bowditch, William E., Roxbury.
Bowker, William H., Boston.
Brackett, Cephas H., Brighton.
Brackett, Charles N., Watertown.
Bresee, Albert, Hubbardton, Vt.

Brewer, Francis W., Hingham.
Briggs, William S., Lincoln.
Brigham, William T., Honolulu, Hawaii.
Brooks, J. Henry, Milton.
Brown, Alfred S., Jamaica Plain.
Brown, Charles E., Yarmouth, N.S.
Brown, Edward J., Weston.
Brown, George Barnard, Brookline.
Brown, John T., Newburyport.
Bullard, John R , Dedham.
Burlen, William H., Boston.
Burnett, Harry, Southborough.
Burr, Matthew H., Hingham.
Buswell, Frank E., Brooklyn, N.Y.
Butler, Aaron, Wakefield.
Butler, Edward K., Jamaica Plain.

Cabot, Edward C., Brookline.
†Cadness, John, Flushing, N.Y.
Cains, William, South Boston.
Calder, Augustus P., Boston.
Cameron, Robert, Cambridge.
Campbell, Francis, Cambridge.
Capen, John, Boston.
Carlton, Samuel A., Boston.
Carr, Hon. John, Roxbury.
Carter, Charles N., Boston.
Carter, Miss Maria E., Woburn.
Cartwright, George, Dedham.
Chadbourne, Marshall W., Mount Auburn.
Chaffin, John C., Newton.
Chamberlain, Chauncy W., Boston.
Chase, Andrew J., Lynn.
Chase, Daniel E., Somerville.
Chase, George B., Dedham.
Chase, William M., Dorchester.
Cheney, Amos P., Natick.
Cheney, Mrs. Elizabeth S., Wellesley.
Childs, Nathaniel R., Boston.
Choate, Charles F., Southborough.
Christie, William, Newton.
Claflin, Hon. William, Newtonville.
Clapp, Edward B., Dorchester.
Clapp, James H., Dorchester.
Clapp, William C., Dorchester.
Clark, Benjamin C., Boston.
Clark, B. Preston, Cohasset.
Clark, Miss Eleanor J., Pomfret Centre, Conn.
Clark, J. Warren, Rockville.
Clarke, Miss Cora H., Boston.
Cleary, Lawrence, West Roxbury.
Clough, Micajah Pratt, Lynn.
Cobb, Albert A., Brookline.
Cobb, John C., Milton.
Coburn, Isaac E., Everett.
Codman, James M., Brookline.
Codman, Ogden, South Lincoln.
Collamore, Miss Helen, Boston.
Converse, Elisha S., Malden.
Converse, Parker L., Woburn.
Coolidge, Joshua, Mount Auburn.
Cottle, Henry C., Boston.
Cowing, Walter H., West Roxbury.
Cox, Thomas A , Dorchester.
Coy, Samuel I., Boston.
Crawford, Dr. Sarah M., Roxbury.
Crocker, Miss S. H., Boston.
Crosby, George E., West Medford.
†Crowell, Randall H., Chelsea.
Curtis, Charles F., Jamaica Plain.
Cushing, Livingston, Weston.
Cushing, Robert M., Boston.

†Daggett, Henry C., Boston.
Damon, Frederick W., Arlington.
Dana, Charles B., Wellesley.
Davenport, Albert M., Watertown.
Davenport, Edward, Dorchester.
Davenport, George E., Medford.
Davis, John, Lowell.
Dawson, Jackson T., Jamaica Plain.
Day, William F., Roxbury.
Dee, Thomas W., Mount Auburn.
Denny, Clarence H., Boston.
Denton, Eben, Dorchester.
Dewson, Francis A., Newtonville.
Dexter, F. Gordon, Boston.
Dickerman, George H., Somerville.
Dike, Charles C., Stoneham.
Doliber, Thomas, Brookline.

Donald, William, West Roxbury.
Dorr, George, Dorchester.
Dove, George W. W., Andover.
Dowse, William B. H., West Newton.
Draper, Hon. Eben S., Hopedale.
Dreer, William F., Philadelphia, Pa.
Dumaresq, Herbert, Chestnut Hill.
Dunlap, James H., Nashua, N.H.
Durant, William, Boston.
Durfee, George B., Fall River.
Dutcher, Frank J., Hopedale.

Eaton, Horace, Cambridge.
Edgar, William W., Waverly.
Eldredge, H. Fisher, Boston.
†Eldridge, E. H., Roxbury.
Ellicott, Joseph P., Boston.
Elliot, Mrs. John W., Boston.
Elliott, William H., Brighton.
Endicott, William, Jr., Boston.
Endicott, William, 3d, Boston.
Endicott, William E., Canton.
Estabrook, Arthur F., Boston.
Everett, William, Dorchester.
Ewell, Warren, Dorchester.

Fairchild, Charles, Boston.
Falconer, William, Pittsburgh, Pa.
Farlow, Lewis H., Newton.
Farnsworth, Mrs. William, Dedham.
Farquhar, James F. M., Roslindale.
Farquhar, John K. M. L., Roxbury.
Farquhar, Robert, Boston.
Faxon, John, Quincy.
Fewkes, Arthur H., Newton Highlands.
Finlayson, Kenneth, Brookline.
Fisher, James, Roxbury.
Flagg, Augustus, Boston.
Fletcher, George V., Belmont.
Fletcher, J. Henry, Belmont.
Fletcher, John W., Chelsea.
Flint, David B., Boston.
Foster, Francis C., Cambridge.
Fottler, John, Jr., Dorchester.
Fowle, George W., Jamaica Plain.
Fowle, William B., Auburndale.
French, J. D. Williams, Boston.
French, Jonathan, Boston.
French, S. Waldo, Jamaica Plain.
French, W. Clifford, Cambridge.
Frohock, Roscoe R., Malden.

Galloupe, Charles W., Swampscott.
Galvin, John, Boston.
Gardner, George A., Boston.
Gardner, George P., Boston.
†Gardner, Henry N., Mount Auburn.
Gibbs, Wolcott, M.D., Newport, R.I.
Gill, George B., Medford.
Gillard, William, Harrison Square, Dorchester.
Gilmore, E. W., North Easton.
Gilson, F. Howard, Reading.
Glover, Joseph B., Boston.
Goddard, A. Warren, Brookline.
Goddard, Joseph, Sharon.
Goddard, Mrs. Mary T., Newton.
Goodell, L. W., Dwight.
Gorham, James L., Jamaica Plain.
†Gould, Samuel, Boston.
Gowing, Mrs. Clara E., Kendall Green.
Gray, James, Wellesley.
Gregory, Hon. James J. H., Marblehead.
Grey, Benjamin, Malden.
Guild, J. Anson, Brookline.

Hadwen, Obadiah B., Worcester.
Hale, James O., Byfield.
Hall, Edwin A., Cambridgeport.
Hall, George A., Chelsea.
Hall, George R., M.D., Warren, R.I.
Hall, Osborn B., Malden.
Hall, William F., Brookline.
Halliday, William H., South Boston.
Hammond, Gardiner G., New London, Conn.
Hammond, George W., Boston.
Hanson, P. G., Woburn.
†Harding, George W., Arlington.
Harding, Louis B., Stamford, Conn.
Hardy, F. D., Cambridgeport.

Harlow, James F., Quincy.
Harris, Charles, Cambridge.
Harris, Thaddeus William, A.M., Keene, N.H.
Harwood, George Fred, Newton.
Haskell, John C., Lynn.
Hastings, Levi W., Brookline.
Hatch, Mrs. C. S., North Cambridge.
Hatch, Edward, Boston.
Hathaway, Seth W., Marblehead.
Hawken, Mrs. Thomas, Rockland, Me.
†Hazeltine, Hazen, Boston.
Hemenway, Augustus, Canton.
Henshaw, Joseph P. B., Boston.
Hewett, Miss Mary C., Canton.
Hews, Albert H., North Cambridge.
Hilbourn, A. J., Boston.
Hill, John, Stoneham.
Hittinger, Jacob, Mount Auburn.
Hoar, Samuel, Concord.
Hodgkins, John E., Portsmouth, N.H.
Hoitt, Hon. Charles W., Nashua, N.H.
Hollingsworth, Amor L., Milton.
Hollis, George W., Grantville.
Holmes, Edward J., Boston.
Holt, Mrs. Stephen A., Winchester.
Horner, Mrs. Charlotte N. S., Georgetown.
Horsford, Miss Kate, Cambridge.
Hovey, Charles H., South Pasadena, Cal.
Hovey, Stillman S., Woburn.
Howard, Joseph W., Somerville.
Hubbard, Charles Wells, Weston.
Hubbard, James C., Everett.
Humphrey, George W., Dedham.
Hunnewell, Arthur, Wellesley.
Hunnewell, Henry Sargent, Wellesley.
Hunnewell, H. Hollis, Wellesley.
Hunnewell, Walter, Wellesley.
Hunt, Dudley F., Reading.
Hunt, Francis W., Melrose.
†Hunt, Franklin, Boston.
Hunt, William H., Concord.

Jack, John George, Jamaica Plain.
Jackson, Charles L., Cambridge.
Jackson, Robert T., Dorchester.
Janvrin, William S., Revere.
Jenks, Charles W., Bedford.
Johnson, J. Frank, Boston.
Jones, Jerome, Brookline.
Jones, Dr. Mary E., Boston.
Jose, Edwin H., Cambridgeport.

Kakas, Edward, West Medford.
Kellen, William V., Marion.
Kelly, George B., Jamaica Plain.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
†Kendall, Joseph R., San Francisco, Cal.
Kendall, Dr. Walter G., Atlantic.
Kendrick, Mrs. H. P., Allston.
Kennedy, George G., M.D., Roxbury.
Kent, John, Brookline.
†Keyes, E. W., Denver, Col.
Keyes, John M., Concord.
Kidder, Charles A., Southborough.
Kidder, Nathaniel T., Milton.
†Kimball, A. P., Boston.
Kingman, Abner A., Brookline.
Kingman, C. D., Middleborough.
Knapp, Walter H., Newtonville.

Lancaster, Charles B., Newton.
Lawrence, Amory A., Boston.
Lawrence, Amos A., Boston.
Lawrence, James, Groton.
Lawrence, John, Groton.
Learned, Charles A., Arlington.
Lee, Daniel D., Jamaica Plain.
Lee, Francis H., Salem.
Leeson, Hon. Joseph R., Newton Centre.
Lemme, Frederick, Charlestown.
Leuchars, Robert B., Brookline.
Lewis, William G., Framingham.
Lincoln, George, Hingham.

Lincoln, Col. Solomon, Boston.
Little, James L., Brookline.
Lockwood, Rhodes, Boston.
Lodge, Richard W., Swampscott.
Loftus, John P., Dorchester.
Loomis, Elihu G., Bedford.
Lothrop, William S. H., Boston.
†Lowder, John, Watertown.
Lowell, Augustus, Boston.
Lumb, William, Boston.
Lunt, William W., Hingham.
Lyman, George H., Wareham.
Lyon, Henry, M.D., Charlestown.

Mabbett, George, Plymouth.
†Mahoney, John, Boston.
Mallet, E. B., Jr., Freeport, Maine.
Mann, James F., Ipswich.
Manning, Jacob W., Reading.
Manning, J. Woodward, Reading.
Manning, Mrs. Lydia B., Reading.
Manning, Robert, Salem.
Manning, Warren H., Brookline.
Marshall, Frederick F., Chelsea.
Marston, Howard, Boston.
Mason, Col. Frederick, Taunton.
Matthews, Nathan, Boston.
May, Frederick W. G., Boston.
McCarty, Timothy, Providence, R.I.
McWilliam, George, Whitinsville.
Melvin, James C., West Newton.
Merriam, Herbert, Weston.
Merrill, Hon. Moody, Roxbury.
Metivier, James, Cambridge.
Milmore, Mrs. Joseph, Washington, D.C.
Minton, James, Boston.
Mitton, Edward J., Brookline.
Mixter, George, Boston.
Monteith, David, Dedham.
Montgomery, Alexander, Natick.
Moore, John H., Concord.
Morgan, George H., New York, N.Y.
†Morse, Samuel F., Boston.
Moseley, Charles H., Dorchester.
Mudge, George A., Portsmouth, N.H.
Murphy, William Bowen, Boston.
Mutch, John, Brookline.

Newman, John R., Winchester.
Newton, Rev. William W., Pittsfield.
Nickerson, George A., Dedham.
Norton, Charles W., Allston.
Norton, Edward E., Boston.

Oakman, Hiram A., North Marshfield.
Olmsted, Frederick Law, Jr., Brookline.
Olmsted, John Charles, Brookline.
Orpet, Edward O., South Lancaster.

Packer, Charles H., Boston.
Paige, Clifton H., Mattapan.
Palmer, Julius A., Jr., Boston.
Parker, Augustus, Roxbury.
Parker, Charles W., Boston.
Partridge, Horace, North Cambridge.
Patten, Marcellus A., Tewksbury.
Paul, Alfred W., Dighton.
Peabody, Francis H., Boston.
Peabody, John E., Boston.
Peck, O. H., Denver, Col.
Peck, William G., Arlington.
Perkins, Edward N., Jamaica Plain.
†Perry, George W., Malden.
Philbrick, William D., Newton Centre.
Pierce, Dean, Brookline.
Pierce, George Francis, Dorchester.
Poor, John R., Boston.
Porter, James C., Wollaston.
Potter, Joseph S., Fredericksburg, Va.
Prang, Louis, Roxbury.
Pratt, Laban, Dorchester.
Pratt, Lucius G., West Newton.
Pratt, Robert M., Boston.
Pray, Dr. Mark W., Boston.
Prescott, Eben C., New York.
Pringle, Cyrus G., Charlotte, Vt.
Prouty, Gardner, Littleton.
Putnam, Joshua H., Newton Centre.

Quinby, Hosea M., M.D., Worcester.

Raddin, Everett W., North Cambridge.
Rand, Miss Elizabeth L., Newton Highlands.
Rand, Harry S., North Cambridge.
Rand, Oliver J., Cambridgeport.
Rawson, Warren W., Arlington.
Ray, James F., Franklin.
Ray, Hon. Joseph G., Franklin.
Raymond, Walter, Boston.
Read, Charles A., Manchester.
Reardon, John B., Boston.
Reed, George W., Boston.
Rice, George C., Worcester.
Richards, John J., Boston.
Richardson, Charles E., Cambridge.
Rinn, J. Ph., Boston.
Ripley, Charles, Dorchester.
Ripley, Ebed L., Hingham Centre.
Robbins, I. Gilbert, Melrose Highlands.
Robinson, John, Salem.
Robinson, Joseph B., Dorchester.
Robinson, Warren J., Somerville.
Ross, Henry, Newtonville.
Ruddick, William H., M.D., South Boston.
Russell, Geo[illegible]rge, Woburn.
Russell, H[illegible]on. John E., Leicester.
Russell[illegible], Walter, Arlington.

Salisbury, William C. G., Boston.
Sanford, Oliver S., Hyde Park.
Sanger, Mrs. George P., Boston.
Sargent, Charles S., Brookline.
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
Scorgie, James C., Cambridge.
†Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, J. Montgomery, Boston.
Shaler, Nathaniel S., Cambridge.
Shaw, Christopher C., Milford, N.H.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Siebrecht, H. A., New Rochelle, N.Y.
Skinner, Francis, Boston.
Smith, Benjamin G., Cambridge.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Jamaica Plain.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco, Cal.
Smith, George O., Boston.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Souther, Charles H., Jamaica Plain.
Spaulding, Edward, West Newton.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Sprague, Hon. Charles F., Brookline.
Sprague, Isaac, Wellesley Hills.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M.D., Roslindale.
Stewart, William J., Woburn.
Stone, C[illegible]
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Sturgis, Russell, Manchester.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G., M.D., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thompson, Leonard, Woburn.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Trepess, Samuel J., Glencove, L.I., N.Y.

†Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Vander-Woerd, Charles, Waltham.
Vinal, Miss Mary L., Somerville.

Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Miss Mary S., Waltham.
Walley, Mrs. W. P., Boston.
Walsh, Michael H., Wood's Holl.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Washburn, Andrew, Hyde Park.
Watson, Benjamin M., Jamaica Plain.
Watson, Thomas A., East Braintree.
[illegible], Waverly.
Webber, Aaron D., Boston.
Webster, Hollis, Cambridge.
Weld, Christopher Minot, Jamaica Plain.
Weld, George W., Newport, R.I.
Weld, Richard H., Boston.
West, Mrs. Maria L., Neponset.
Weston, Seth, Revere.
Wheeler, Frank, Concord.
Wheeler, Wilfred, Concord.
Wheelwright, A. C., Brookline.
Whitcomb, William B., Medford.
White, Francis A., Brookline.
White, Joseph H., Brookline.
Whitney, Arthur E., Winchester.
Whitney, Ellerton P., Milton.
Whittier, Hon. Charles, Roxbury.
Whittier, George E., Groton.
Wilbur, George B., West Newton.
Wilder, Edward Baker, Dorchester.
Wilder, Henry A., Malden.
Willard, E. W., Newport, R.I.
Willcutt, Levi L., West Roxbury.
Williams, Aaron D., Boston.
Williams, Benjamin B., Boston.
Williams, Philander, Taunton.
Willis, George W., Chelsea.
Willis, Joshua C., Roxbury.
Wilson, Col. Henry W., Boston.
Wilson, William Power, Boston.
Winthrop, Robert C., Jr., Boston
Wood, Edmund M., Natick.
Wood, William K., West Newton.
Woods, Henry, Boston.
Wright, George C., West Acton.
Wright, John G., Brookline.
Wyman, Oliver B., Shrewsbury.

ANNUAL MEMBERS.

Members of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Allen, Charles L., Floral Park, N.Y.
Alles, William H., Hyde Park.
Anderson, George M., Milton.
Arnold, Mrs. Anna E., Roxbury.
Arnold, Miss Sarah L., Newton Centre.
Atkinson, Edward, Brookline.
Ayers, Miss Helen F., Medford.

Badlam, William H., Dorchester.
Barker, John G., Melrose.
Barr, John, Wellesley.
Benedict, Washington G., Boston.
Bigelow, Arthur J., Eastlake, Worcester.
Bigelow, Mrs. Nancy J., Southborough.
Bird, John L., Dorchester.
Bliss, Benjamin K., East Bridgewater.
Blomberg, Carl, North Easton.
Bock, William A., North Cambridge.
Bolles, William P., M.D., Roxbury.
Bouvé, Lander M., Brookline.
Boyden, Clarence F., Taunton.
Braman, George H., Newton.
Breck, Charles H., Newton.
Breck, Charles H. B., Brighton.
Brown, David H., West Medford.
Brunton, Frank, Boston.
Butler, Edward, Wellesley.

Carpenter, Frank O., West Roxbury.
Carroll, James T., Chelsea.
Carter, Mrs. Sarah D. J., Wilmington.
Cary, Miss Alice B., Lexington.
Chase, Joseph S., Malden.
Chase, Leverett M., Roxbury.
Chase, Philip A., Lynn.
Chubbuck, Isaac Y., Roxbury.
Clapp, Henry L., Roxbury.
Clark, John W., North Hadley.
Clark, Joseph, Manchester.
Clark, Theodore M., Newtonville.
Clarke, Frederick E., Lawrence.
Clinkaberry, Henry T., Trenton, N.J.
Collins, Frank S., Malden.
Comley, James, Lexington.
Coolidge, David H., Jr., Boston.
Coolidge, Sumner, Mount Auburn.
Cotter, Lawrence, Dorchester.
Cotting, Charles U., Boston.
Councilman, Prof. W. T., Boston.
Crosby, J. Allen, Jamaica Plain.
Curtis, Joseph H., Boston.
Curtis, Louville, Tyngsborough.

Davis, Frederick, Boston.
Davis, Frederick S., West Roxbury.
Dawson, Charles Jackson, Jamaica Plain.
Dolbear, Mrs. Alice J., College Hill.
Doran, Enoch E., Brookline.
Dorr, George B., Boston.
Doyle, William E., East Cambridge.
Duffley, Daniel, Brookline.

Eaton, Warren E., Reading.
Endicott, Miss Charlotte M., Canton.
Ewell, Marshall F., Marshfield Hills.

Fenno, Warren, Revere.
Fisher, Sewall, Framingham.
Fitzgerald, Desmond, Brookline.
Fletcher, Fred W., Auburndale.
Forbes, William H., Jamaica Plain.
Francis, George E., M.D., Worcester.
French, Charles G., Utica, N.Y.
Frost, Artemas, Belmont.
Frost, George, West Newton.
Frost, Varnum, Arlington.
Fuller, T. Otis, Needham.

Gibbon, Mrs. James A., Brookline.
Gill, Mrs. E. M., Medford.
Gilman, Hon. Virgil C., Nashua, N.H.
Grant, Charles E., Concord.
Grew, Henry Sturgis, Boston.
Grey, Thomas J., Chelsea.

Hall, Charles H., M.D., Boston.
Hall, Stacy, Boston.
Hallstram, Charles W., Boston.
Hargraves, William J., Jamaica Plain.
Harris, Frederick L., Wellesley.
Harrison, C. S., York, Nebraska.
Harrison, Thomas, Melrose Highlands.
Hartwell, Samuel, Lincoln.
Hatfield, T. D., Wellesley.
Henshaw, Samuel, West Brighton, N.Y.
Hersey, Alfred H., Hingham.
Hersey, Edmund, Hingham.
Heustis, Warren H., Belmont.
Hill, J. Willard, Belmont.
Hobbs, George M., Boston.
Hollis, George, South Weymouth.
Horton, Herbert A., Brookline.
Houghton, George S., West Newton.
Hubbard, F. Tracey, Cambridge.
Huston, Miss Katharine W., Jamaica Plain.

Ireland, Robert D., Winthrop.

James, Robert Kent, Dorchester.
Jameson, G. W., East Lexington.

Keith, Miss Mary R., Washington, D.C.
Kelsey, Harlan P., Boston.
Kemp, William S., Brookline.
Kennard, Frederic H., Brookline.
Kenrick, Miss Anna C., Newton.

Lancaster, Mrs. E. M., Roxbury.
Lawrence, Henry S., Roxbury.
Lincoln, Miss Agnes W., Medford.
Lomax, George H., Somerville.
Lombard, Richard T., Wayland.
Loring, Charles G., Boston.
Loring, William C., Beverly.
Lothrop, Thornton K., Boston.
Low, Hon. Aaron, Hingham.

Manda, W. A., South Orange, N.J.
Manning, A. Chandler, Reading.
Martin, William J., Milton.
Masten, Cornelius E., Roxbury.
Maynard, Charles, North Easton.
McLaren, Anthony, Westwood.
McMullen, Edgar, Boston.
Meriam, Horatio C., D.M.D., Salem.
Merrill, John J., Roxbury.
Milman, William, Roxbury.
Moody, Abner J., Boston.
Moore, George D., Arlington.
Morgan, George M., Boston.
Morison, George Abbot, Cambridge.
Moseley, Frederick Strong, West Newbury.
Munson, Prof. W. M., Orono, Me.

Newton, John F., Roxbury.
Nicholson, William, Framingham.
Norton, Michael H., Boston.
Norton, Patrick, Dorchester.

Olmsted, Frederick Law, Brookline.

Park, William D., Boston.
Parker, John, Newtonville.
Parker, Walter S., Reading.
Patterson, William, Quincy.
Peirce, George H., Concord Junction.
Petremant, Robert, Brooklyn, N.Y.
Pettigrew, John A., Jamaica Plain.
Pickman, Dudley L., Boston.
Pierce, Mrs. F. A., Brookline.
Plimpton, Willard P., West Newton.
Power, Charles J., South Framingham.
Pray, James Sturgis, Cambridge.
Purdie, George A., Wellesley Hills.

Rea, Charles H., Norwood.
Rea, Frederic J., Norwood.
Rich, Miss Ruth G., Dorchester.
Rich, William E. C., Roxbury.
Rich, William P., Chelsea.
Richards, Mrs. P. D., West Medford.
Robbins, Oliver R., Weston.
Robinson, Walter A., Arlington.
Ross, Charles W., Newtonville.
Ross, Henry Wilson, Newtonville.
Rothwell, James E., Brookline.

Sander, Charles, Brookline.
Saunders, Miss Mary T., Salem.
Sawtelle, J. M., Fitchburg.
Scott, Augustus E., Lexington.
Scudder, Samuel H., Cambridge.
Searles, E. F., Methuen.
Seaver, Edwin P., LL.D., Waban.
Sharp, Miss Helen, Boston.
Sharples, Stephen P., Cambridge.
Shaw, Hon. Edward P., Newburyport.
Shepard, Harvey N., Boston.
Sheppard, Edwin, Lowell.
Smith, Archibald, Somerville.
Southworth, Edward, Quincy.
Squire, Miss Esther A., North Cambridge.
Stearns, Mrs. Charles A., East Watertown.
Stearns, Charles H., Brookline.
Stevens, Mrs. Mary L., Cambridge.
Stevens, Miss Mary O., North Andover.
Stone, Joshua C., Watertown.
Storer, Charles, Providence, R.I.
Story, Miss Sarah W., Brighton.
Sutherland, George A., Roslindale.
Swan, Charles W., M.D., Brookline.

Tailby, Joseph, Wellesley.
Teele, William H., West Acton.
Terry, Rev. Calvin, North Weymouth.
Thatcher, William, Brookline.
Toby, Rufus T., Roxbury.
Travis, Charles B., Brighton.
Tyndale, Theodore H., Brookline.

Vaughan, J. C., Chicago, Ill.

Warren, Samuel H., Weston.
Welch, Patrick, Dorchester.
Wells, Benjamin T., Newtonville.
Westwood, Thomas H., Jamaica Plain.
Wheeler, Henry A., Newtonville.
Wheeler, James, Brookline.
White, Maurice P., Roxbury.
White, W. Henry, Lowell.
Whitney, Joseph, Cambridgeport.
Whiton, Hon. Starkes, Hingham Centre.
Wilkie, Edward A., Newtonville.
Winter, William C., Mansfield.
Wolcott, Mrs. H. L. T., Dedham.
Wood, Mrs. Anna D., West Newton.
Wood, Elijah A., West Newton.
Wood, E. W., West Newton.
Woodford, Joseph H., Boston.
Woods, Henry F., Boston.

Young, Arthur W., Hingham.
Young, Charles S., Newton Centre.
Young, E. Bentley, Boston.

Zirngiebel, Denys, Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXII.

Life Members.

The payment of thirty dollars shall constitute a Life Membership, and exempt the member from all future assessments, and any Annual Member, having paid all dues, may become a Life Member by the payment of twenty dollars in addition thereto.

Annual Membership.

Every Annual Member, before he receives his diploma, or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIII.

Withdrawal or Discontinuance of Membership.

Any member may withdraw from the Society, on giving notice to the Treasurer and paying the amount due from him. Any member who shall neglect for the space of two years to pay his annual assessment, after due notice from the Treasurer, shall cease to be a member. The Treasurer shall give notice of such withdrawals or discontinuances to the Secretary, who shall erase such members' names from the list.

The attention of Annual Members is particularly called to Section XXIII.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Joseph Maxwell, *elected in* 1830, *and* George W. Smith, *elected in* 1851.

Hon. George S. Boutwell, Groton.
H. W. S. Cleveland, Chicago, Ill.
Joseph Jefferson, Buzzard's Bay.
Major L. A. Huguet-Latour, M.P., Montreal, Canada.
Joseph Maxwell, Rio Janeiro, Brazil.
Donald G. Mitchell, New Haven, Conn.
Hon. J. Sterling Morton, Ex-Secretary of Agriculture, Nebraska City, Neb.
Baron R. Von Osten Sacken, Heidelberg, Germany.
Samuel B. Parsons, Flushing, N.Y.
George W. Smith, Boston.
Hon. James Wilson, Secretary of Agriculture, Washington, D.C.

CORRESPONDING MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly reporting to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Alexander Burton, *elected in* 1829, S. Reynolds, M.D., 1832, *and* Francis Summerest (or Summerer), 1833.

Édouard André, Editor in Chief of the Revue Horticole, Paris, France.

Professor L. H. Bailey, Horticultural Department, Cornell University, Ithaca, N.Y.

John Gilbert Baker, F.R.S., F.L.S., Keeper of the Herbarium of the Royal Gardens, Kew.

Charles Baltet, Président de la Société Horticole, Vigneronne, et Forestière de l'Aube, Troyes, France.

Peter Barr, London, England.

Archibald F. Barron, Turnham Green, London, W.

Napoleon Baumann, Bolwiller, Alsace.

D. W. Beadle, 303 Crawford St., Toronto, Ontario.

Professor William J. Beal, Agricultural College, Michigan.

Prosper J. Berckmans, Ex-President of the American Pomological Society, Augusta, Ga.

Charles E. Bessey, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.

Dr. Ch. Bolle, Berlin, Prussia.

John Croumbie Brown, LL.D., Haddington, Scotland.

Professor J. L. Budd, Secretary of the Iowa Horticultural Society, Ames.

William Bull, Chelsea, England.

F. W. Burbidge, M.A., Trinity College Botanic Garden, Dublin, Ireland.

Alexander Burton, United States Consul at Cadiz, Spain, Philadelphia.

Maxime Cornu, Director of the Jardin des Plantes, Paris, France.

Daniel T. Curtis, Dorchester.

Rev. H. Honywood D'Ombrain, Westwell Vicarage, Ashford, Kent, England.

Malcolm Dunn, Dalkeith, Scotland.

W. T. Thiselton Dyer, C.M.G., F.R.S., Director of the Royal Botanic Gardens, Kew, England.

Parker Earle, President of the American Horticultural Society, Roswell, N.M.

George Ellwanger, Rochester, N.Y.

HENRY JOHN ELWES, F.L.S., F.Z.S., Colesborn, Andoversford, Gloucestershire, England.

WILLIAM G. FARLOW, M.D., Professor of Cryptogamic Botany, Harvard University, Cambridge.

B. E. FERNOW, Forestry School, Cornell University, Ithaca, N.Y.

HON. ROBERT W. FURNAS, Ex-President of the Nebraska State Horticultural Society, Brownville.

CHARLES A. GOESSMANN, Ph.D., LL.D., Chemist of the Hatch Experiment Station of the Massachusetts Agricultural College, Amherst.

GEORGE L. GOODALE, M.D., Professor of Botany, Harvard University, Cambridge.

OBADIAH B. HADWEN, President of the Worcester County Horticultural Society, Worcester.

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The Massachusetts Horticultural Society is endeavoring to collect complete sets of the Bulletins and other publications of all the Agricultural Experiment Stations in the United States and Canada. Those named below are wanting, and any person having a spare copy will confer a favor by addressing the Librarian of the Society, Horticultural Hall, No. 101 Tremont Street, Boston.

Alabama (Ag. and Mech. College Station). — Bulletins 4–6 (1884), 7–10 and 1–4 (1885), and 5–9 (1886). 7th Annual Report, for 1894, and 9th, for 1896.

Alabama (Canebrake Station). — All Bulletins later than 18, and all Annual Reports later than the 3d, for 1890.

Arizona. — 4th Annual Report, for 1893.

Arkansas. — Bulletin 1. All Annual Reports later than the 4th, for 1891, except the 8th, for 1895.

California. — Bulletins 32, 1878, and 1, 2, 3, 5, and 50, New Series.

Colorado. — Bulletin 3.

Connecticut (New Haven Station). — Bulletins 1 to 67, inclusive. Annual Reports for 1877 to 1883, inclusive, except that for 1878.

Florida. — Annual Reports for 1891 and 1892.

Indiana (Purdue Univ. School of Ag.). — Bulletin 1. College Reports 1 to 14, inclusive.

Kentucky. — Bulletin 10.

Michigan. — Special Bulletins 1, 3, and 5. 6th Annual Report, for 1892–93. (Contained in Report of Michigan Board of Agriculture, 1893.)

Missouri. — Bulletins 9, 13, 15, 16, 19, 20, 25, 26, and 33 of Old Series. All Annual Reports since the 1st, for 1888, except those for 1896 and 1897.

New Jersey. — Bulletins 1, 4, 5, 15, 27, and 28.

New York (Cornell). — Annual Report, 1882–83 (Report of Agricultural Department of Cornell University).

North Carolina. — Bulletins 1 to 56, inclusive, and 69, 2d ed. 1st to 7th Biennial Reports. Meteorological Division, Bulletin 2 (68*b*), and 2d and 3d Annual Reports, for 1888 and 1889. Special Bulletins 1 (77*a*) and 4 (82*a*). Weekly Weather Crop Bulletins 1–21, 1888; 1–24, 1889; 1–25, 1890; 2 and 4, 1891.

North Dakota. — 4th Annual Report, for 1893.

Ohio. — All Bulletins of First Series, except 16, 17, 18, and 19.

Pennsylvania. — Annual Reports for 1869, 1872, 1879–89, 1881, 1882, 1883, and 1884. [All issued by the State College.] Bulletin of Information No. 1.

South Carolina. — All Bulletins of the Old Series (previous to 1888) on the work of the Experimental Farm of the South Carolina College. 3d Annual Report, for 1890, and 6th, for 1893.

Texas. — College Bulletins 1–5, 1883–1887.

Washington. — 6th, 7th, and 8th Annual Reports, for 1895–96, 1896–97, and 1897–98 All Bulletins later than 27.

West Virginia. — Special Bulletin — Potash and Paying Crops, 1890.

Wyoming. — Bulletins 2 to 4, 9, and 10.

Ontario Department of Agriculture, Toronto. — Bureau of Industries. — Agricultural Returns to the Ontario Bureau of Industries, Nov. 1882 (5th), Aug. 1883 (7th), and Nov. 1887 (20th).

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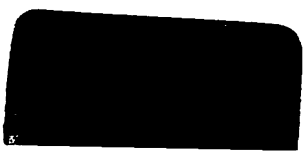
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